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Monticello Millsite Environmental Report for Calendar Year 1991

May 1992

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Grand Junction Projects Office

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MONTICELLO MILLSITE ENVIRONMENTAL REPORT

FOR CALENDAR YEAR 1991

May 1992

Prepared for

the U.S. Department of Energy

Grand Junction Projects Office

DOE Field Office, Albuquerque

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ABBREVIATIONS AND ACRONYMS

Alky	Alkalinity
Bq/F	becquerels per filter
Bq/Kg	becquerels per kilogram
Bq/L	becquerels per liter
Cdt	Electrical conductivity
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DCG	Derived Concentration Guides
DOE	U.S. Department of Energy
Dtw	Depth to water
EDE	Effective Dose Equivalent
EML	Environmental Measurements Laboratory
EMSL	Environmental Measurement Systems Laboratory
EPA	U.S. Environmental Protection Agency
FFA	Federal Facilities Agreement
F/mm^2	Filter per square millimeter
g/F	grams per filter
GJPO	Grand Junction Projects Office
MED	Manhattan Engineer District
mg/L	milligrams per liter
mrem/qtr	millirems per quarter
mrem/yr	millirems per year
NEPA	National Environmental Policy Act of 1969
NPL	National Priorities List
pCi/F	picocuries per filter
pCi/L	picocuries per liter
pg/mL	picograms per milliliter
PM_{10}	Particulate matter less than or equal to 10 microns in diameter
QA	Quality Assurance
QAP	Quality Assurance Program
QAPP	Quality Assurance Program Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RI/FS--EA	Remedial Investigation/Feasibility Study--Environmental Assessment
SARA	Superfund Amendments and Reauthorization Act
scfm	standard cubic feet per minute
TLD	Thermoluminescent dosimeter
TOC	Total Organic Carbon
µg/F	micrograms per filter
µg/L	micrograms per liter

ABBREVIATIONS AND ACRONYMS (continued)

$\mu g/m^3$	micrograms per cubic meter
$\mu g/mL$	micrograms per milliliter
μm	micrometers
$\mu mhos/cm$	micromhos per centimeter
UMTRCA	Uranium Mill Tailings Radiation Control Act
VCA	Vanadium Corporation of America

EXECUTIVE SUMMARY

This report contains information pertaining to environmental activities conducted during calendar year 1991 at and near the inactive uranium millsite in Monticello, Utah. It has been prepared in accordance with the requirements of U.S. Department of Energy (DOE) Order 5400.1 and with supplemental information received from DOE Headquarters. Monitoring and report preparation were performed by Chem-Nuclear Geotech, Inc., the DOE contractor for the Grand Junction Projects Office facility in Grand Junction, Colorado.

Environmental activities conducted at the Monticello Millsite during 1991 included those associated with remedial action and compliance monitoring. Compliance monitoring consisted of both radiological and nonradiological monitoring of air, surface water, and ground water.

Remedial action activities conducted were primarily those concerned with Comprehensive Response, Compensation, and Liability Act (CERCLA) requirements. The *Draft Final Remedial Design Work Plan* (Chem-Nuclear Geotech, Inc. 1991a) for the design of the remedial action at the Monticello Millsite was submitted to the U. S. Environmental Protection Agency (EPA) and state of Utah in June 1991. Designs for the individual phases of remedial action also were prepared in 1991 according to requirements identified in the Monticello Mill Tailings Site Record of Decision (US-DOE 1990). In December 1991, the *Draft Monticello Surface- and Ground-Water Remedial Action Project CERCLA Management Plan* (Chem-Nuclear Geotech, Inc. 1991b) was submitted to EPA and the state of Utah.

Radiological and nonradiological air monitoring at the millsite included measurements of atmospheric radon, particulate matter, and gamma radiation. Atmospheric radon concentration was measured at six off-site and two site-boundary locations. During 1991, one of the off-site and both of the site-boundary locations had radon concentrations exceeding the EPA standard for atmospheric radon. These results are consistent with analytical results from previous years. The effective dose equivalent (EDE) to the maximally exposed individual near the millsite was calculated as 56 mrem/yr, exclusive of background. This dose, which included radon and gamma source terms, was well below the DOE limit of 100 mrem/yr above background.

Air particulate monitoring for radiological and nonradiological constituents was conducted at one on-site and two off-site locations with high-volume particulate samplers. The maximum airborne concentrations of radium-226, thorium-230, and uranium were all several orders of magnitude below the regulatory limits specified by DOE Order 5400.5. The maximum concentrations of lead were below the EPA limit of 1.5 micrograms per cubic meter ($\mu g/m^3$) at all measurement locations. The EPA

standards of 50 $\mu g/m^3$ (annual arithmetic mean) and 150 $\mu g/m^3$ (24-hour average) for acceptable levels of particulate matter smaller than or equal to 10 micrometers were not exceeded at any location.

A monitoring program for gamma radiation was established in April 1991. All on-site monitoring locations yielded gamma radiation levels above the established background level (105 millirems per year), whereas all but one of the off-site locations yielded levels similar to the background levels.

Surface water monitoring included water quality measurements within Montezuma Creek. This perennial creek, which flows through the millsite property, has frequently contained contaminants at levels exceeding state of Utah surface water standards as far as 3 to 5 kilometers (2 to 3 miles) downstream of the property. Contamination of the creek results from discharge of the contaminated alluvial aquifer. During 1991, maximum concentrations of selenium and gross alpha in samples obtained from the creek exceeded their respective standards of 0.01 milligrams per liter and 15 picocuries per liter. Montezuma Creek is used for both irrigation and livestock watering in the vicinity of the site.

Ground water monitoring was conducted for two aquifers underlying the Monticello Millsite--a shallow, alluvial aquifer and a deeper, confined Burro Canyon aquifer. The shallow aquifer is contaminated by leached products of uranium mill tailings. During 1991, Uranium Mill Tailings Radiation Control Act and state of Utah ground water standards for arsenic, selenium, molybdenum, uranium 234+238, gross alpha particle activity, and radium-226+228 were exceeded in one or more wells. Samples collected from the deeper Burro Canyon aquifer revealed that no federal or state standards were exceeded.

INTRODUCTION

The Monticello Millsite is a 31.6-hectare (78-acre) tract located in San Juan County, Utah, within the city limits of Monticello (Figure 1). No residences are located within the millsite boundary, but residences are adjacent to the north, south, and east edges of the site. In 1990, the population of Monticello was 1,838.

Geographically, the millsite is located in the valley of Montezuma Creek, a perennial stream that flows from west to east through the center of the millsite. Alluvium and sedimentary rocks underlie the property. The surrounding land is used for residences, farming/ranching, and recreation (e.g., camping, hiking, and hunting).

The mill was constructed by the Vanadium Corporation of America (VCA) in 1942 with funds from the Defense Plant Corporation. Initially, vanadium was produced, but from 1943 to 1944, a uranium-vanadium sludge was produced by VCA for the Manhattan Engineer District (MED). After milling operations by the VCA ceased in 1944, the mill was leased from 1945 to 1946 to produce the uranium-vanadium sludge for MED. The Atomic Energy Commission purchased the site in 1948. Uranium milling began in September 1949 and continued to January 1960 when the mill was permanently closed. At that time, part of the land was transferred to the Bureau of Land Management. This land was returned to the U. S. Department of Energy (DOE) in 1990, and the DOE now owns and manages this returned parcel along with the remainder of the site.

The mill area covers approximately 4 hectares (10 acres), and the tailings impoundment area covers the remaining 27.6 hectares (68 acres). None of the original mill buildings remain (except for a maintenance shed), but contaminated foundations and scrap materials are buried on site. The tailings impoundment area contains an estimated 1,019,000 cubic meters (1,350,000 cubic yards) of tailings and contaminated soil in four discrete piles (Figure 2). An additional 204,000 cubic meters (270,000 cubic yards) of contaminated material is present on adjacent open lands (Marutzky and others 1985).

Prior to 1955, the environmental problems receiving attention at the Monticello Millsite arose from the salt roast procedure used to enhance vanadium recovery. Along with chlorine and hydrogen chloride gas, an average of nearly 1,182 kilograms (2,600 pounds) of dust containing 0.363 percent uranium oxide (U_3O_8) and 1.52 percent vanadium pentoxide (V_2O_5) escaped daily through the roaster stack (Allen and Klemenic 1954). Corrosion of wire fences, clotheslines, and galvanized roofs was verified by the mill operator in response to complaints from local residents.

Liquid effluent from the salt roast/carbonate leach plant (which contained substantial concentrations of chloride, sulfate, carbonate, bicarbonate, sodium, and other dissolved species) was released into Montezuma Creek. Release of radium-226 was of special concern; soluble radium activity in Montezuma Creek was measured at 160 picocuries per liter (pCi/L). It was also recognized that the suspended solids contained

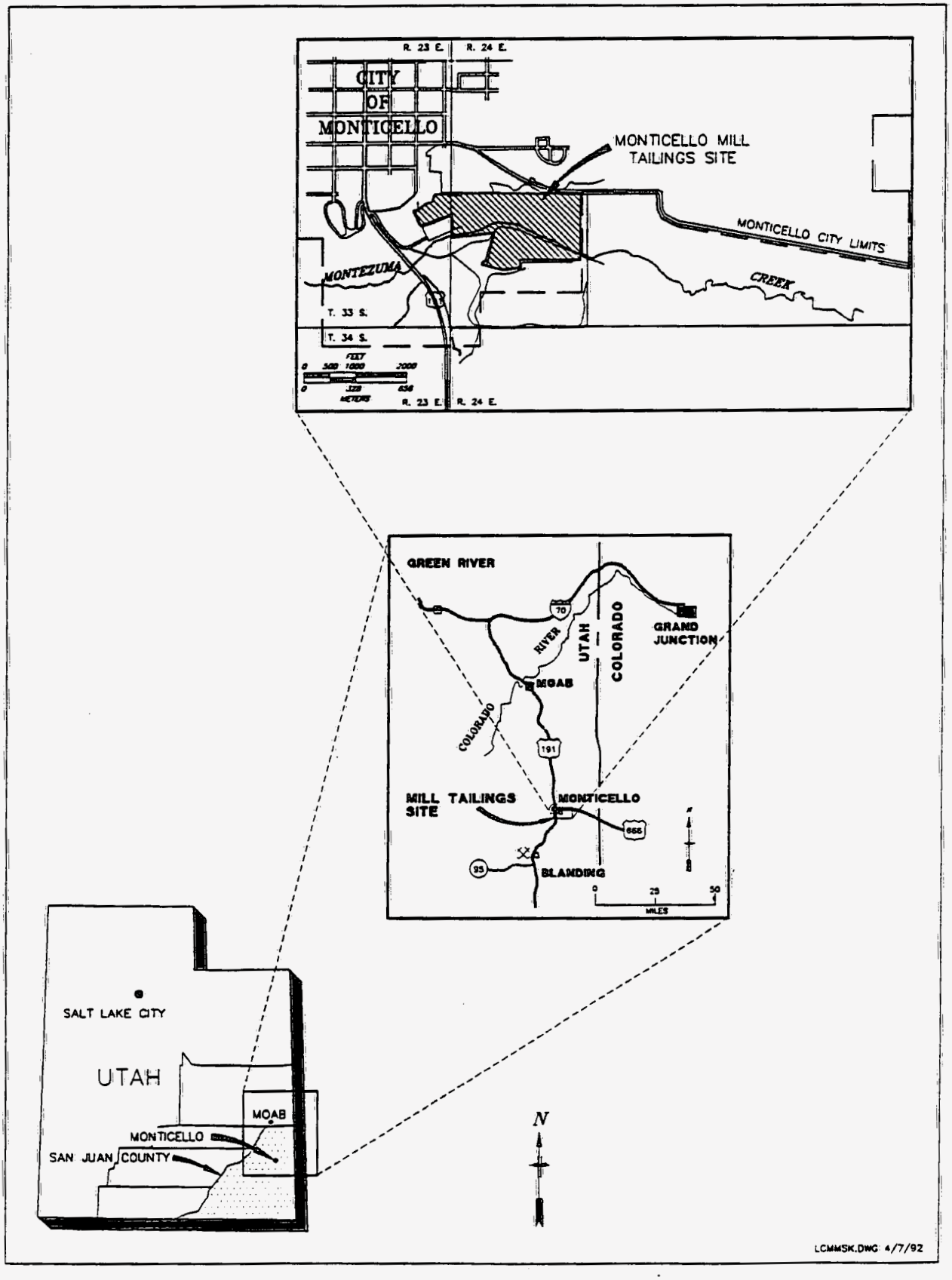

Figure 1. Site Location Map for the Monticello Millsite

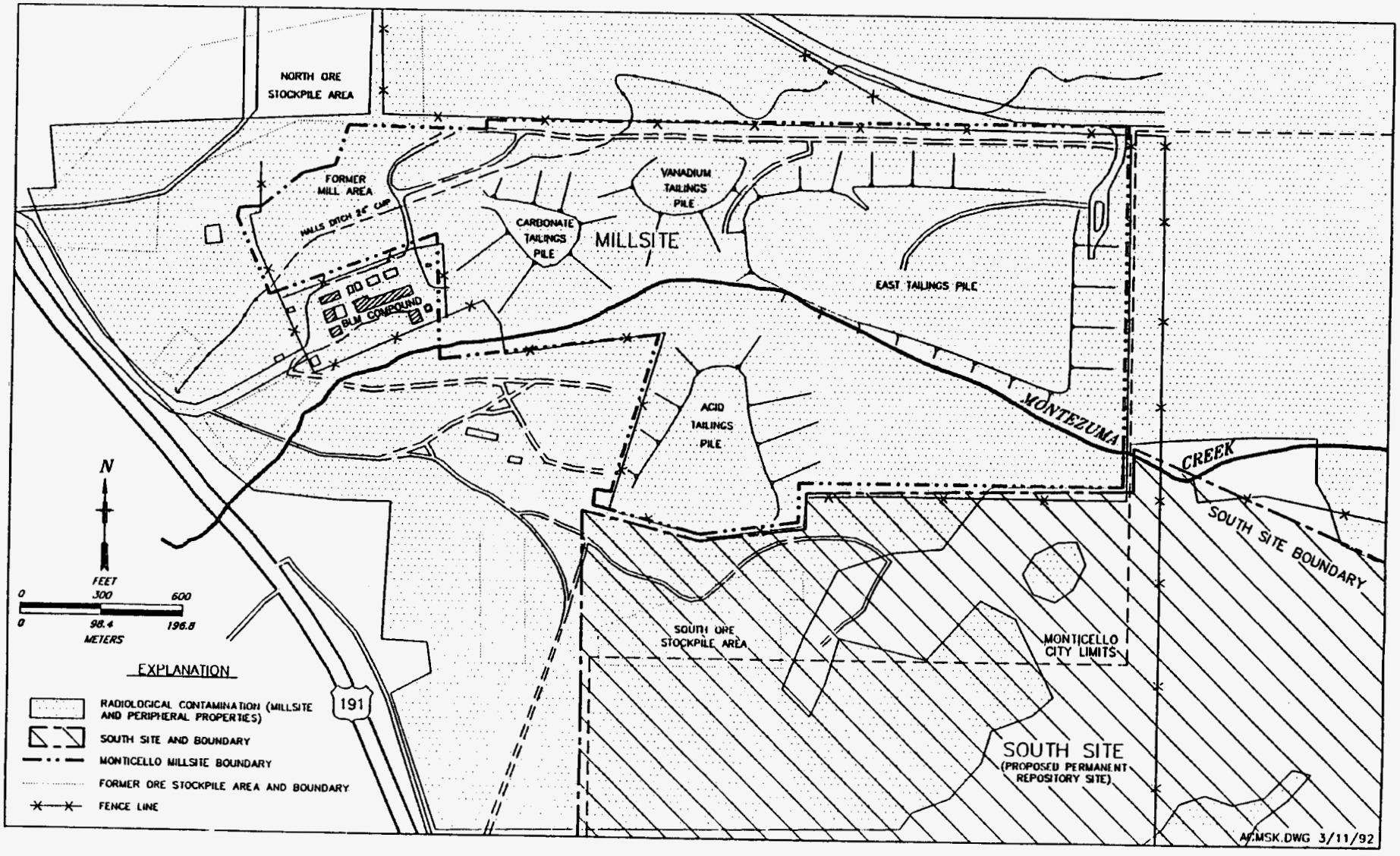

Figure 2. Radiological Contamination Map for the Monticello Millsite

considerable radium activity and that dry tailings were being washed into the creek (Whitman and Beverly 1958).

During milling operations, the tailings were usually moist and erosion by wind was minimal. Within a year after shutdown, however, the tailings dams and surfaces of the tailings piles dried out, and tailings sand began to migrate as dunes. Erosion by water also became a problem. Several cleanup activities conducted by the U. S. Atomic Energy Commission after mill closure substantially stabilized the area but did not eliminate water contamination. Extensive studies (Lennemann 1956, George 1958, George 1959, Whitman and Beverly 1958, UNC Geotech 1990) conducted at Monticello demonstrate that all four tailings piles contribute to the contamination of ground water and surface water, both on and off site. Presently, the contaminated ground water is not used in the vicinity of the millsite, and Montezuma Creek water is used for livestock watering and irrigation downstream of the millsite.

Responsibility for the administration, maintenance, and environmental monitoring of the inactive uranium millsite and tailings area, formerly operated by the Atomic Energy Commission, resides with the DOE's Grand Junction Projects Office (GJPO). Chem-Nuclear Geotech, Inc. (Geotech), the prime contractor for the DOE-GJPO, performs the environmental monitoring at the millsite. The site was accepted into the Surplus Facilities Management Program in 1980. Under this program, the chief objective of the Monticello Remedial Action Project was to minimize potential health hazards to the public and environment that are associated with the tailings at the millsite. To provide a basis for making decisions regarding the remediation of the site, an environmental and engineering characterization was completed and documented in the *Monticello Remedial Action Project Site Analysis Report* (Abramiuk and others 1984). In addition, the *Final Remedial Investigation/Feasibility Study--Environmental Assessment for the Monticello, Utah, Uranium Mill Tailings Site* (RI/FS--EA) (UNC Geotech 1990) report was finalized in March 1990, and the *Monticello Mill Tailing Site--Declaration for the Record of Decision and Record of Decision Summary* (US-DOE 1990) was approved by the Environmental Protection Agency (EPA), state of Utah, and DOE in September 1990.

This Site Environmental Report presents information pertaining to environmental activities conducted during calendar year 1991 at the Monticello Millsite. It is organized into six major sections: Compliance Summary - January 1, 1991 through April 1, 1992; Environmental Program Information; Environmental Radiological Program Information; Environmental Nonradiological Program Information; Ground Water Protection Program; and Quality Assurance.

The Compliance Summary section summarizes GJPO compliance with federal and state environmental requirements at the Monticello Millsite for the period January 1, 1991 through April 1, 1992.

The Environmental Program Information section includes: (1) a description of the contamination present at the site, (2) a summary of air and surface water monitoring

performed on and near the site, including a discussion of how monitoring results compare to applicable standards, (3) a list of environmental permits issued to the site by federal and state regulatory agencies, and a list of environmental documents completed in 1991 pertaining to site activities, and (4) a summary of significant environmental activities occurring at the site.

The third and fourth sections, Environmental Radiological and Environmental Nonradiological Program Information, summarize the results of the radiological and nonradiological monitoring programs, respectively, conducted on and near the millsite.

In the Ground Water Protection Program section, the hydrogeology at the millsite and the program conducted to monitor ground water are described. Analytical results of ground water monitoring are compared to federal and state standards.

The Quality Assurance section summarizes the measures taken to ensure the quality of monitoring data collected at and near the millsite. The section also includes results of the participation of the Geotech Analytical Chemistry Laboratory in interlaboratory cross-check programs.

Included for the reader's information are an Abbreviations and Acronyms section, which follows the Contents page of the report; a References section, which follows the Quality Assurance section; and a Distribution List section, which lists persons and organizations who receive copies of this report.

COMPLIANCE SUMMARY - JANUARY 1, 1991 THROUGH APRIL 1, 1992

COMPLIANCE STATUS

Compliance status for each of the major federal and state environmental statutes applicable to the Monticello Millsite is as follows:

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - The Monticello Millsite was listed on the National Priorities List (NPL) on November 21, 1989. Environmental restoration of the millsite is prescribed in a Federal Facility Agreement (FFA) between the DOE-GJPO, EPA, and the state of Utah (agreement signed in December 1988). DOE-GJPO activities associated with the Monticello Millsite have been conducted in full compliance with the FFA.

  The *Final Remedial Design Work Plan* (Chem-Nuclear Geotech, Inc. 1992a) for the design of the remedial action for the Monticello Millsite was submitted to EPA and the state of Utah in January 1992.

  Designs for several phases of the Monticello Remedial Action Project were prepared in accordance with the applicable or relevant and appropriate requirements identified in the Monticello Mill Tailings Site Record of Decision (US-DOE 1990). The following design documents were submitted to DOE and/or EPA and the state of Utah for review during 1991:

  - Well Abandonment Plan for the Monticello Millsite
  - Millsite Site Preparation 30% Design
  - Millsite Site Preparation 90% Design
  - Millsite Pre-excavation 30% Design
  - Repository Site Preparation 30% Design
  - Repository 30% Design
  - Radiological and Engineering Assessment for Peripheral Properties MP-00964, MP-00178(I), and MP-00198

  Remedial action on the millsite was initiated with the start of well abandonment activities in August 1991. Section 120 of the Superfund Amendments and Reauthorization Act (SARA) requires federal facilities to commence substantial and continuous physical on-site remedial action within 15 months of the completion of the Record of Decision. DOE met this requirement by beginning remediation activities within 11 months.

  The *Draft Monticello Surface- and Ground-Water Remedial Action Project CERCLA Management Plan* (Chem-Nuclear Geotech, Inc. 1991a), required for the investigation and remediation of Operable Unit III, was submitted to EPA and the state of Utah in December 1991.

The Information Repositories for the Monticello Mill Tailings NPL Site and the Monticello Vicinity Properties NPL Site were periodically updated in 1991, as required by CERCLA.

- Clean Air Act - Air quality at the millsite is monitored to verify conformance with ambient air quality standards. As determined in the RI\FS--EA (UNC Geotech 1990), the Clean Air Act is an applicable or relevant and appropriate requirement for remedial action at the millsite. The millsite is specifically identified under and subject to the provisions of 40 CFR 61, Subpart Q, which defines a radon flux standard for DOE facilities. This flux standard is exceeded at the tailings piles on the millsite. A proposed compliance position for Subpart Q requirements addressing the Memorandum of Understanding recently negotiated between DOE and EPA was submitted to EPA and the state of Utah for review on December 13, 1991. Review comments were received from EPA and the state of Utah on January 15, 1992. A revised compliance position paper was resubmitted for approval during the spring of 1992. One objective of the planned environmental restoration will be to remove the source of contamination so that the radon flux standard is no longer exceeded.

- Utah Air Conservation Regulations - Section R446-1-4.5 of these regulations, which establishes fugitive dust control requirements, is applicable to the Monticello Millsite. Measures taken to comply with these requirements included 1) application of water spray to all construction areas and haul roads, and 2) cessation of construction operations during wind speeds of greater than 40 miles per hour.

- Clean Water Act/Executive Order 11990, "Protection of Wetlands" - As determined in the RI/FS--EA (UNC Geotech 1990), the Clean Water Act is a specified applicable or relevant and appropriate requirement for remedial action at the millsite. Waters at the millsite are routinely monitored with respect to state of Utah water quality standards, which are promulgated by the Clean Water Act. Both surface water and ground water at the millsite are contaminated by the leached products of uranium mill tailings and contain concentrations of these products that exceed applicable standards. One objective of the planned environmental restoration will be to remove the source of contamination so that water quality standards are no longer exceeded.

  In accordance with Section 404 of the Clean Water Act and Executive Order 11990, "Protection of Wetlands," potential effects of all site remedial activities on surface- and ground-water sources will be evaluated, and the discharge of dredge or fill materials into navigable waters will be avoided.

- Executive Order 11988, "Floodplain Management" - Because the Monticello Millsite is within the floodplain of Montezuma Creek, as determined by the U. S. Army Corps of Engineers (1990), Executive Order 11988, "Floodplain Management," is a potential applicable requirement for remedial action. The order requires the DOE to evaluate remedial actions and to avoid adverse impacts associated with direct and indirect development of the floodplain.

- Utah Pollution Discharge Elimination System (UPDES) - Through consultations with the State of Utah Water Quality Division, the DOE began the process of obtaining a UPDES permit for the water treatment plant planned for construction in 1994 adjacent to the Monticello Millsite. Specific water quality threshold limits for the wastewater discharge from this plant into Montezuma Creek are presently being determined. The DOE has received copies of the EPA Application Form 1 ("General Information") and the EPA Application Form 2D ("New Sources and New Dischargers: Application for Permit to Discharge Process Wastewater"). To determine background levels of parameters required to be measured in Application Form 2D, Montezuma Creek will be sampled at four locations during spring and fall 1992.

- State of Utah Ground Water Quality Protection Regulations - Tailings excavated from the millsite will be placed in an on-site repository. The design of this repository will address measures to be taken to protect the existing and probable future uses of ground water at the disposal site. Discharge from the repository will be controlled to the extent necessary to ensure that contaminant levels at downgradient monitoring wells do not exceed established protection levels. Design options currently being considered focus on the control of discharge volume and quality.

- Safe Drinking Water Act (SDWA) - The provisions of the SDWA are potentially relevant to the Monticello Millsite because of the presence of the Burro Canyon Formation, which is located at depth beneath the millsite and is used as a public water supply. Should contamination associated with millsite activities be identified in the Burro Canyon aquifer, maximum contaminant levels may be used to establish cleanup standards.

- Resource Conservation and Recovery Act (RCRA) - No RCRA-listed or characteristic hazardous waste is treated or disposed of at the site, and no treatment, storage, or disposal of such wastes is expected to occur during remedial action. However, if hazardous wastes not considered byproduct materials are discovered on site during remedial actions, RCRA would be an applicable or relevant and appropriate requirement.

- National Environmental Policy Act (NEPA) - The RI/FS--EA (UNC Geotech 1990) was completed for millsite activities and approved by EPA and the state of Utah in January 1990. A Finding of No Significant Impact for remediation of the millsite was issued in February 1990. The Monticello Mill Tailings Site Record of Decision (US-DOE 1990) was signed by EPA and state of Utah in September 1990. The *Draft Environmental Assessment of Additional Lands Proposed for Acquisition for the Monticello, Utah, Uranium Mill Tailings Repository* (Chem-Nuclear Geotech, Inc. 1992b), for the acquisition of 800 acres of land adjacent to the Monticello Millsite was submitted to DOE-Headquarters for review and approval in February 1992. No other NEPA documentation was prepared in 1991 or during the first quarter of 1992. Ongoing activities at the millsite are evaluated for compliance with NEPA.

- Endangered Species Act - This act requires the DOE to ensure that actions authorized, funded, or carried out at the Monticello Milsite will not jeopardize the continued existence of threatened or endangered species or destroy or adversely modify critical habitat required for the continued existence of that species. Although no presently threatened or endangered species have been identified at or near the millsite, these federal provisions are potentially applicable requirements.

- National Historic Preservation Act - The regulations implementing this act require the DOE to take into account the effect of any federally-assisted undertaking or licensing on a structure or object that is included on or eligible for the National Register of Historic Places. These regulations are potentially applicable to remedial activities at the millsite.

CURRENT ISSUES AND ACTIONS

A work plan for the characterization of nonradiological wastes on the former Bureau of Land Management's compound was submitted to EPA and the state of Utah for review in October 1991. Review comments were received on December 30, 1991. A revised plan is anticipated to be submitted to EPA and the state of Utah for approval in late spring 1992.

A letter of authorization for the drilling and completion of 62 boreholes at the Monticello Millsite was issued by the State of Utah Natural Resources Division of Water Rights in June 1991. The boreholes were drilled and sampled in June and July 1991 to determine the vertical extent of contamination present. Water level measurements may be provided and water quality analyses, if they are made, may be submitted to the Division of Water Rights upon request.

A delay in the land acquisition of the proposed Repository Site has caused lease-term and agreement disputes with private property owners of farmlands located adjacent to the Monticello Millsite. These disputes have resulted in access being denied to these lands since November 9, 1991. Access to wells on these lands is imperative to obtain data necessary for the assessment and characterization of ground water at the Repository Site and Monticello Millsite. Resolution of this issue is anticipated to occur by summer 1992.

SUMMARY OF FACILITY PERMITS

No facility permits are presently required at the Monticello Millsite.

ENVIRONMENTAL PROGRAM INFORMATION

SOURCES OF CONTAMINATION

Uranium mill tailings are the principal waste type at the Monticello Millsite. Residual uranium ore in old ore stockpile areas at the millsite constitutes only a minor waste type. Historically, environmental concern has focused on the radiological hazards associated with the tailings and ore. However, a number of trace elements typically occur at elevated concentrations in uranium ore. These were not recovered during milling operations but were passed through the circuit to the tailings piles. Because hazardous organic chemicals were not used in the milling process, the hazardous substances selected for waste characterization were all inorganic.

According to Albrethsen and McGinley (1982), 819,291 metric tons (903,298 short tons) of uranium ore were processed at the Monticello mill between 1948 and 1960 to yield approximately 2,077 metric tons (2,290 short tons) of uranium oxide (U_3O_8) and 1,061 metric tons (1,170 short tons) of vanadium pentoxide (V_2O_5). Most of the original constituents of the ore, as well as the chemicals added during the milling process, reside in the tailings.

The tailings generated by the milling operations are contained in four piles referred to, in order of their construction, as the Carbonate, Vanadium, Acid, and the East tailings piles (Figure 2). The Carbonate and Vanadium tailings piles were formed during the period from 1949 to 1955 when the mill was recovering vanadium as a by-product. The process used for the recovery was a salt roast/carbonate leach process. Use of the Acid tailings pile commenced about 1955. This pile received tailings from the acid leach resin-in-pulp process and a carbonate leach circuit. The East tailings pile operated from 1956 until mill shutdown in 1960 and received tailings from the acid leach circuit and the high temperature, carbonate leach resin-in-pulp circuit.

Photographs taken during the operation of the millsite indicated that earthen berms were initially used to impound the tailings. As the impoundment filled, sandy tailings were apparently used as berm material to maintain the ponds. After closure of the mill, the piles were regraded and stabilized by covering them with pit-run gravel and top soil and seeding a vegetative cover. Materials from all four tailings piles provide a contaminant source for ground water leachate and atmospheric releases. A critical pathway analysis, in which source terms and pathways of radiation exposure were determined, was performed and documented in the RI/FS--EA (UNC Geotech 1990).

ENVIRONMENTAL MONITORING SUMMARY

Air

Atmospheric Radon

The environmental radon monitoring program was initiated at the Monticello Millsite in 1984 with the installation of 19 sample locations. After a year of baseline data was collected, the sampling network was reduced to eight representative locations. In 1991, radon concentration was measured at these locations (Figure 3) with TechOps Radtrak® alpha-sensitive detectors. The detectors were exposed in duplicate 1 meter above the ground surface and were analyzed on a quarterly (3-month exposure) basis.

The EPA standard (40 CFR Part 192) for atmospheric radon concentration (at the edge of an inactive uranium mill tailings pile) of 0.50 pCi/L above background has been adopted for the Monticello Millsite. From a natural background concentration of 0.41 pCi/L (UNC Geotech 1990), the site-specific standard of 0.91 pCi/L was calculated. As illustrated in Table 1, the atmospheric radon concentrations measured during 1991 exceeded the EPA standard at both locations along the site boundary and at one off-site location (RN-M-04). Concentrations at the remaining off-site locations were below the standard. These values are consistent with previous years' analytical results. Quarterly data collected at each location are listed in Tables A-1 through A-4 in Appendix A.

Table 1. Comparison of Average Annual Radon Concentrations At and Near the Monticello Millsite to the EPA Standard for the Period November 16, 1990 to December 30, 1991

Sampling Location	Radon Concentration	
	Annual Average (pCi/L)	EPA Standard (including background) (pCi/L)
On Site		
RN-M-06	1.26	0.91
RN-M-07	2.98	0.91
Off Site		
RN-M-04	1.45	0.91
RN-M-10	0.24	0.91
RN-M-11	0.46	0.91
RN-M-13	0.28	0.91
RN-M-14	0.45	0.91
RN-M-15	0.44	0.91

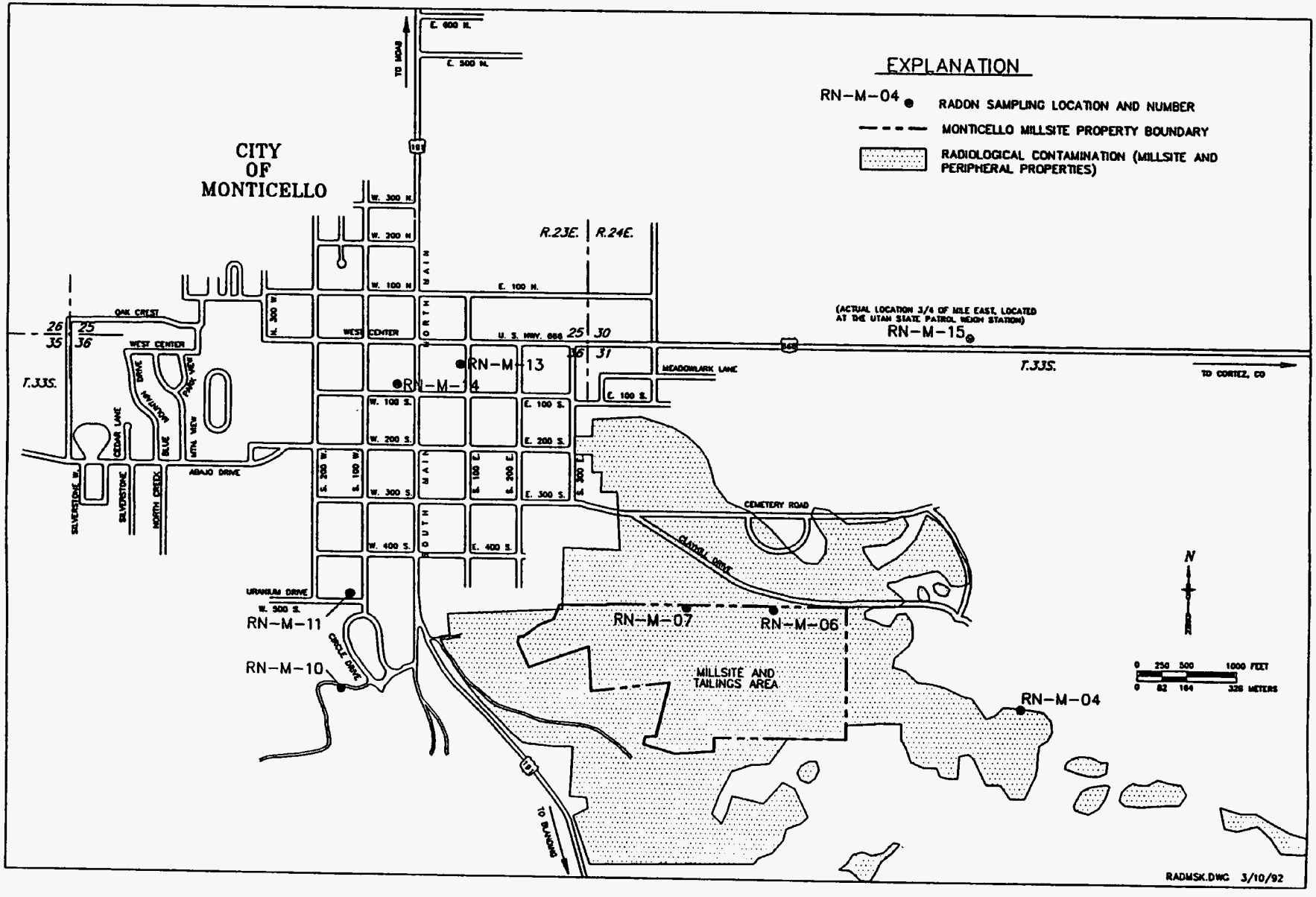

Figure 3. Atmospheric Radon Monitoring Locations At and Near the Monticello Millsite

Air Particulates

Air particulate monitoring for the Monticello Millsite is conducted to comply with federal regulatory requirements. DOE Order 5400.1, *General Environmental Protection Program*, specifies that environmental surveillance will be conducted to monitor the effects of DOE activities on on-site and off-site natural resources. Demonstration of compliance with the public dose limits of DOE Order 5400.5, *Radiation Protection of the Public and the Environment*, is based on calculations that make use of information obtained from environmental monitoring programs. DOE Order 5400.5 lists derived concentration guides (DCGs) for air that provide reference values for conducting radiological environmental protection programs. The DOE guidance document, *Radiological Effluent Monitoring and Environmental Surveillance* (US-DOE 1991), recommends identifying and monitoring diffuse sources such as tailings piles. National primary and secondary air quality standards (40 CFR Part 50), which were deemed appropriate and applicable for this facility at the program outset, define maximum acceptable levels of particulate matter and lead necessary to protect public health.

Air particulate monitoring was initiated at the Monticello Millsite in August 1983. The original air sampling network consisted of three high-volume air samplers that sampled ambient air at 40 standard cubic feet per minute (scfm) for 24 hours every sixth day. Particulates were collected on a glass-fiber filter. In March 1987, 10-micrometer size-selective inlets were installed in the intake of the samplers to separate particles 10 micrometers or smaller (PM_{10}) from larger particles. The 10-micrometer or smaller particles were considered to be the respirable and biological damaging component and were collected on a glass-fiber filter in the sampler. The heavier, windblown particulates and fugitive dust were eliminated by the 10-micrometer size-selective inlet.

Wind-rose data collected on site have clearly identified two principal wind vectors in the area, one to the east and one to the north. Thus, sampling stations were located along these two predominant wind directions as well as at a background site (Figure 4). The background site (AIR-M-6) is located approximately 0.8 kilometer (0.5 mile) west of the city of Monticello near the pumphouse building for the city water supply. The intake port for this sampler is 3 meters (10 feet) above ground level. West of this site lies mostly natural desert and mountainous terrain that contains no local industrial activity. The east sampling station (AIR-M-4) is located on the eastern edge of the East tailings pile. The sampler intake is mounted approximately 3 meters (10 feet) above ground level on a steel tower. The north station (AIR-M-5) is located on the west side of the city of Monticello cemetery grounds. This location is 30 meters (100 feet) north of the tailings area at an elevation of 100 meters (330 feet) above the piles; the sampler intake is 4 meters (13 feet) above ground level.

During 1991, air particulate sampling was conducted from April 1 through October 28 on every sixth day for 24 hours. Sampling was suspended prior to April 1 and after October 28 because snow cover eliminated any potential for airborne radioparticulate emissions.

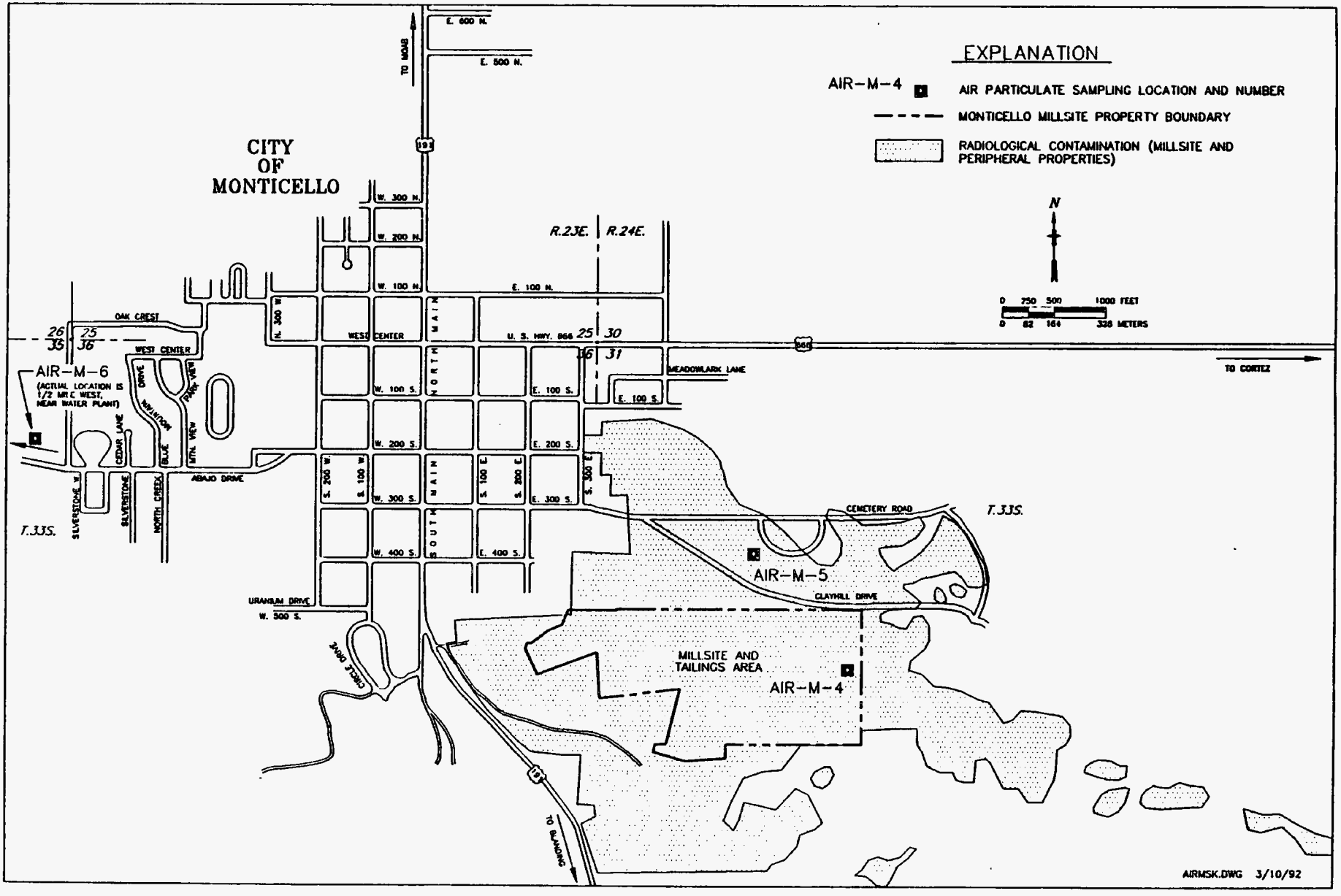

Figure 4. Air Particulate Sampling Locations At and Near the Monticello Millsite

Radiological analytes measured included total uranium, radium-226, and thorium-230. Nonradiological analytes measured included PM_{10} particulate matter and lead. Radiological and lead analyses are performed by the Geotech Analytical Chemistry Laboratory. PM_{10} determinations are made by subtracting the pre-sample filter weight from the post-sample filter weight. To determine the mass of PM_{10} per unit volume of air (i.e., micrograms per cubic meter [$\mu g/m^3$]), the mass difference is divided by the volume of air that passed through the filter medium. Results of 1991 sampling are reported in Tables A-5 through A-10 in Appendix A.

Radiological air particulate levels are regulated at DOE facilities by DOE Order 5400.5, which lists DCGs applicable to the Monticello Millsite. Used as reference values for conducting radiological environmental protection programs, DCGs represent concentrations that would cause a member of the public to receive a dose of 100 mrem per year from inhalation of a specific radionuclide. Table 2 compares total uranium, radium-226, and thorium-230 DCGs (inclusive of background levels) with maximum and average concentrations measured at and near the Monticello Millsite during 1991. Figures 5 through 7 show concentrations of total uranium, thorium-230, and radium-226 as a percentage of their respective DCG at station AIR-M-4 for the period April through October 1991. Plots for air monitoring stations AIR-M-5 and AIR-M-6, although not included in this report, exhibit similar trends to AIR-M-4 plots. All measured concentrations are well below the respective DCGs.

Acceptable levels of lead and PM_{10} particulate matter are defined by EPA under the National Ambient Air Quality Standards. The lead standard specifies that a 3-month average concentration is not to exceed 1.5 $\mu g/m^3$; the PM_{10} standard specifies a maximum annual arithmetic mean of 50 $\mu g/m^3$ and a 24-hour concentration not to exceed 150 $\mu g/m^3$. The maximum lead concentration of 0.062 $\mu g/m^3$, the maximum PM_{10} annual average of 14.71 $\mu g/m^3$, and the 24-hour maximum concentration of 41.62 $\mu g/m^3$ measured in 1991 (Table 2) are all within their respective compliance levels. Figure 8 shows measured PM_{10} concentrations as a percentage of the EPA standard at station AIR-M-4 for the period April through October 1991, and Figure 9 compares lead concentrations to the EPA standard for the same station and period. Plots for air monitoring stations AIR-M-6 and AIR-M-7, although not included in this report, are similar to AIR-M-4 plots.

Although no formal self-assessment was performed on the Monticello ambient air monitoring program, results from a December 1991 self-assessment of a similar program at a different facility were applied to the Monticello program. The following decisions, which will be implemented in 1992, were made concerning the monitoring program:

- Elemental lead analyses of particulates will no longer be conducted. Lead was a suspected airborne contaminant because of its presence in uranium mill tailings. As shown in Figure 9, the ambient lead concentration values are well below the standard. When the tailings pile relocation project begins, analyses for lead will resume.

Table 2. Results of Monticello Millsite Air Particulate Study Conducted During 1991

		Radiological Elements					NonRadiological Element	Suspended Particulates
		Uranium (pg/mL)	Uranium (μCi/mL)	Radium-226 (μCi/mL)	Thorium-230 (μCi/mL)	Thorium-230 (pg/mL)	Lead ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)
	Standard	No Standard	2.0 E-12[a]	1.0 E-12	4.0 E-14	No Standard	1.5	150 Maximum 50 Annual Average
Station								
AIR-M-4	Maximum[b]	.001616	1.076E-15	1.309E-15	7.462E-16	3.846E-08	.061885	28.1791
	Average[c]	.001251	8.331E-16	8.019E-16	4.037E-16	2.081E-08	.043153	12.7312
	Count[d]	29 (29)	29 (29)	29 (22)	29 (27)	29 (27)	29 (29)	33 (33)
AIR-M-5	Maximum	.001544	1.028E-15	1.971E-15	6.064E-16	3.126E-08	.055522	41.6243
	Average	.001213	8.081E-16	7.721E-16	3.869E-16	1.994E-08	.042985	14.7124
	Count	30 (30)	30 (30)	30 (18)	30 (26)	30 (26)	30 (30)	34 (34)
AIR-M-6	Maximum	.001561	1.039E-15	1.934E-15	9.205E-16	4.745E-08	.05691	30.8114
	Average	.001213	8.079E-16	7.631E-16	3.540E-16	1.825E-08	.042794	11.2491
	Count	30 (30)	30 (30)	30 (17)	30 (27)	30 (27)	30 (30)	34 (30)

[a]Scientific notation E = "x 10."
[b]Maximum concentration.
[c]Annual average concentration.
[d]Number of samples collected (number of samples having concentrations above detection limits).

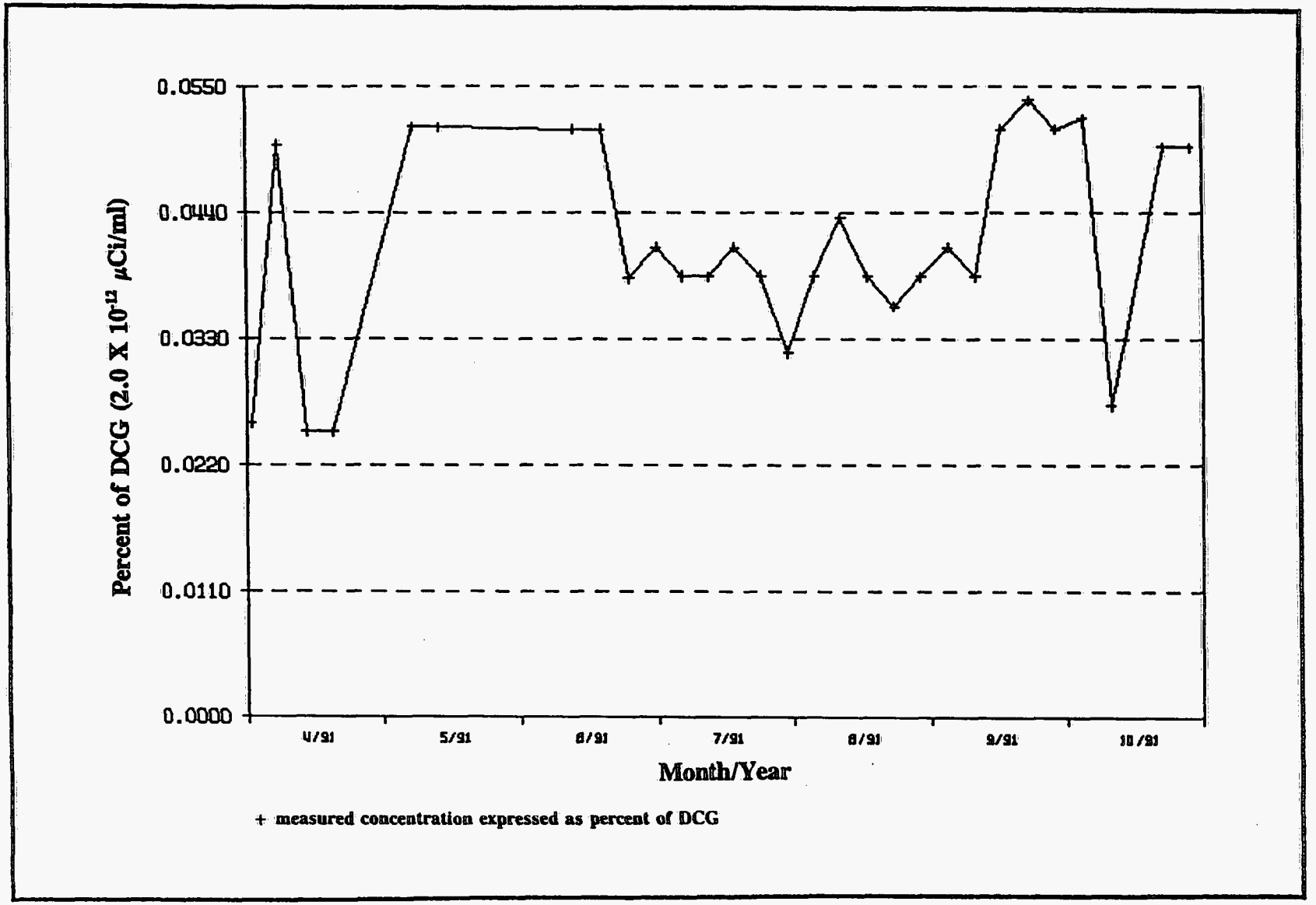

Figure 5. Uranium Concentrations in Ambient Air as a Percentage of the DCG at Station AIR-M-4 From April Through October 1991

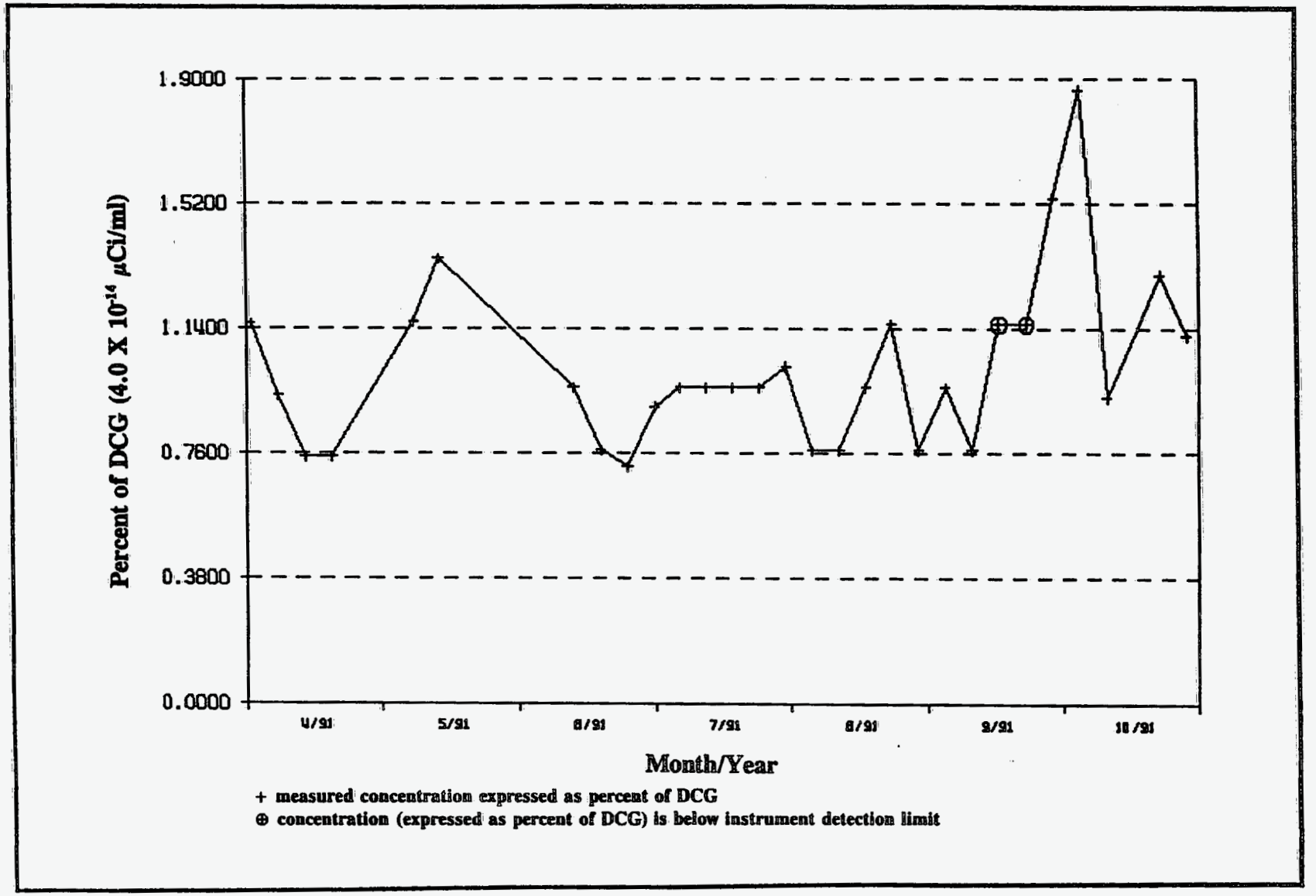

Figure 6. Thorium-230 Concentrations in Ambient Air as a Percentage of the DCG at Station AIR-M-4 From April Through October 1991

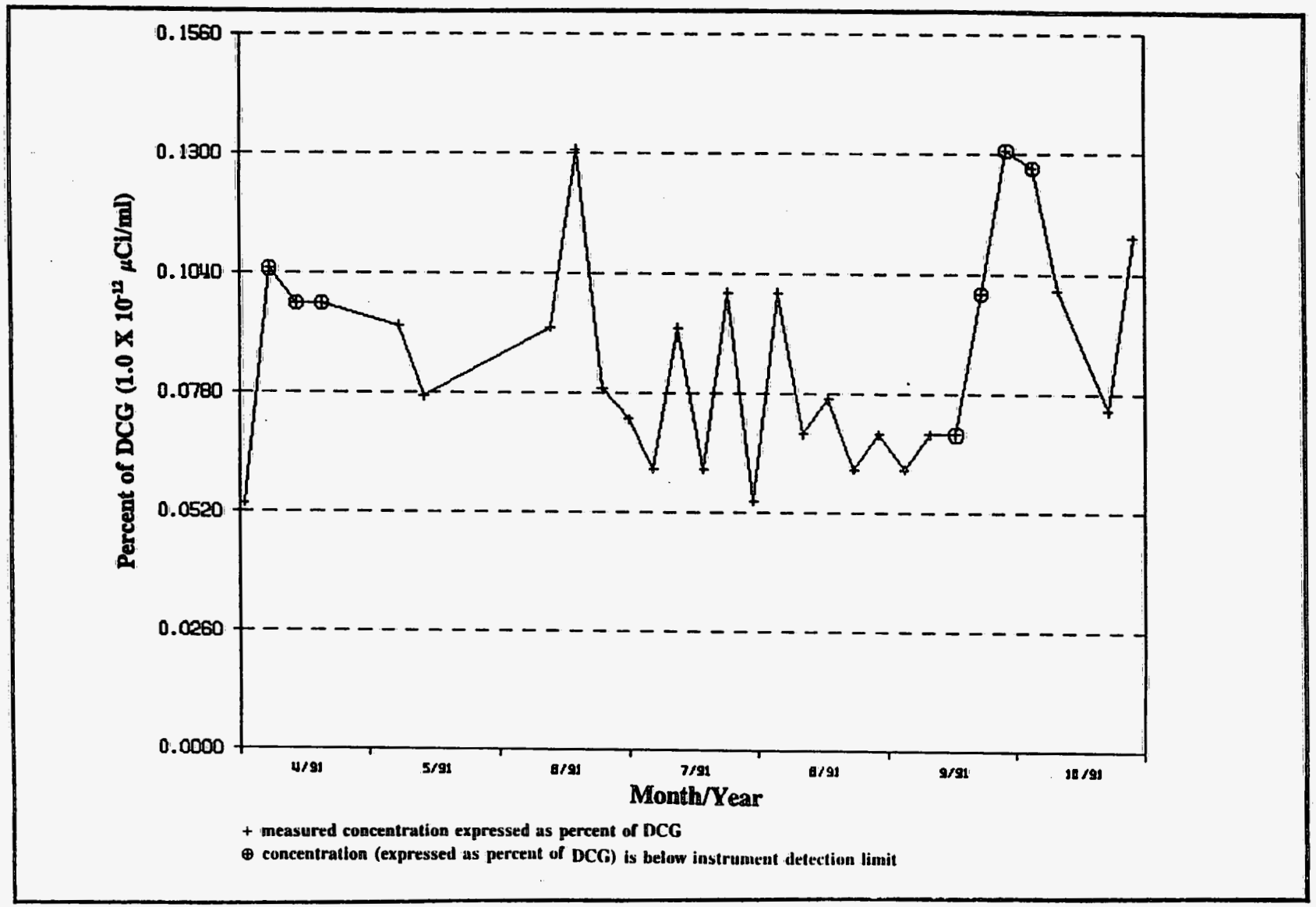

Figure 7. Radium-226 Concentrations in Ambient Air as a Percentage of the DCG at Station AIR-M-4 From April Through October 1991

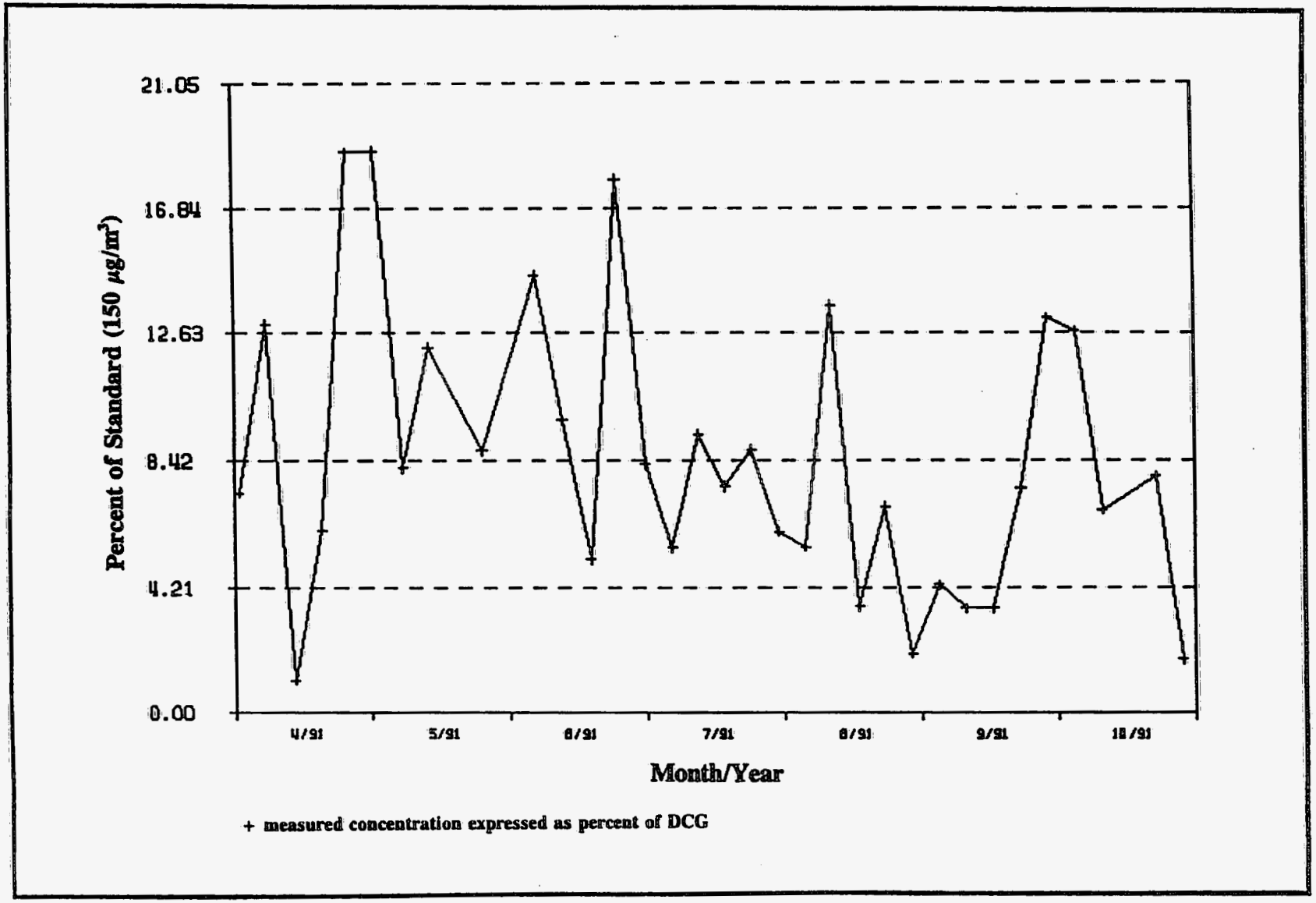

Figure 8. PM_{10} Concentrations in Ambient Air as a Percentage of the EPA Standard at Station AIR-M-4 From April Through October 1991

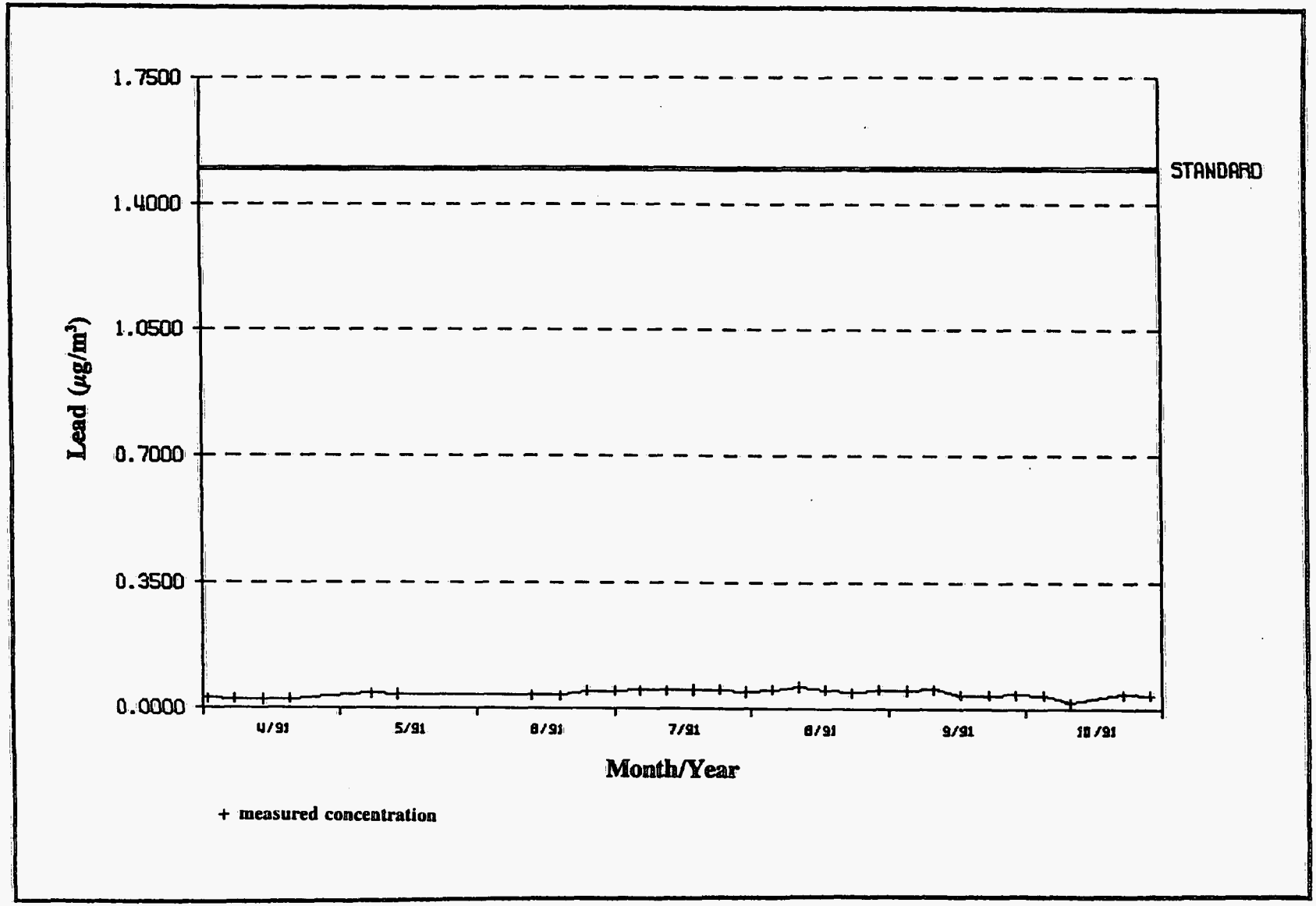

Figure 9. Lead Concentrations in Ambient Air at Station AIR-M-4 From April Through October 1991

- Sampling for nonradiological PM_{10} and radiological air particulates will be performed separately. Since conception of the Monticello ambient air monitoring program, nonradiological PM_{10} and radiological air particulates were sampled at the same time. However, the PM_{10} sampling criteria of a 24-hour sample period was not long enough to allow radioparticulate accumulations to reach measurable levels. Therefore, sampling for radioparticulates will be performed separately by running the samplers continuously for a 5-day period once a month. The 5-day period allows for greater radioparticulate accumulation and hence, better data quantification.

Direct Gamma Radiation Monitoring

A direct environmental radiation monitoring program began at the Monticello Millsite in April 1991. The program was begun to assess the potential gamma radiation dose to persons on and near the millsite, in accordance with DOE Order 5400.5 and the DOE guidance document, *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance* (US-DOE 1991). No standard has been established for maximum gamma radiation levels at or near the Monticello Millsite. However, gamma radiation measurements are included, along with radiation measurements associated with radon and air particulates, in the calculation of total off-site dose to the public (see Envirionmental Radiological Program Information section).

During 1991, radiation measurements were made using $CaSO_4$:Dy (calcium sulfate dysprosium) thermoluminescent dosimeters (TLDs). Thirteen monitoring locations (Figure 10) on the Millsite and surrounding areas were monitored quarterly. Results of the monitoring are presented in Tables A-11 through A-13, Appendix A, and are summarized in Table 3. The background level of gamma radiation, measured at station TLD-M-1, was estimated to be 105 millirems per year (mrem/yr). All on-site measurements exceeded background levels; two of the off-site locations had average annual measurements exceeding background levels.

Meteorology

Meteorological monitoring at the Monticello Millsite was not conducted during 1991. Because of delays in the installation of a new monitoring station and subsequent technical problems, a valid meteorological data set could not be collected. The technical problems have been resolved so that 1992 meteorological data can be collected. Although not desirable, the loss of 1991 meteorological data is not critical. Because atmospheric transport models make use of several years of data to obtain average conditions, the loss of 1 year of data is not expected to significantly affect average values.

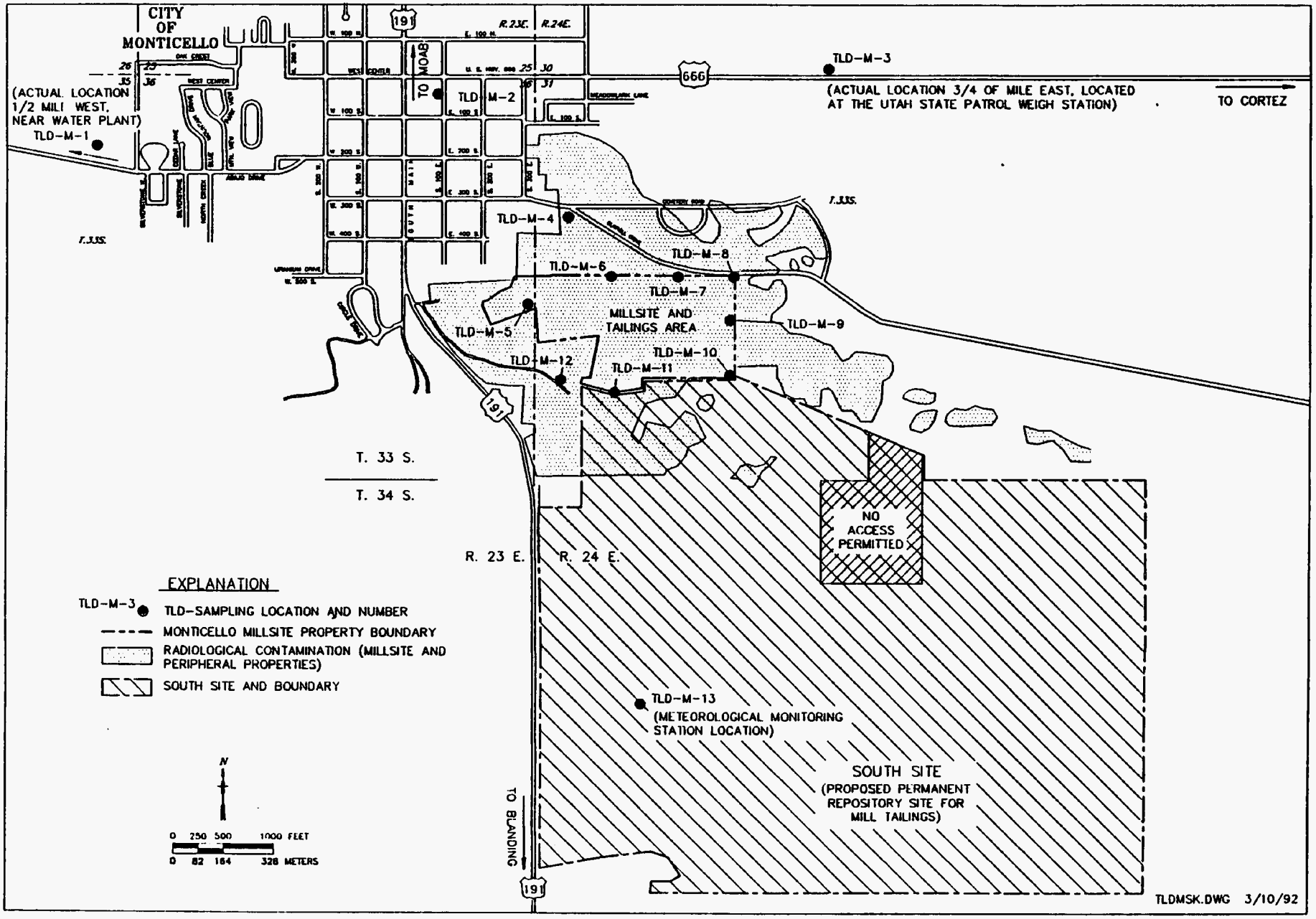

Figure 10. Direct Environmental Radiation Monitoring Locations At and Near the Monticello Millsite

Table 3. Average Annual Gamma Exposure Rates At and Near the Monticello Millsite for the Period April 1 through December 30, 1991

Sampling Location	Gamma Exposure Annual Average (mrem/yr)	Background (mrem/yr)
On Site		
TLD-M-5	455	105
TLD-M-6	403	105
TLD-M-7	167	105
TLD-M-8	121	105
TLD-M-9	209	105
TLD-M-10	128	105
TLD-M-11	203	105
TLD-M-12	492	105
Off Site		
TLD-M-1	105	105
TLD-M-2	101	105
TLD-M-3	100	105
TLD-M-4	136	105
TLD-M-13	107	105

Surface Water

Montezuma Creek, the main surface water body in the project area, flows through the middle of the property from west to east. Although flow is generally perennial, the creek can be quite low or dry during the late summer. Sampling sites W-3 and W-5 (Figure 11) have been used to collect upgradient water quality samples from the creek. Although site W-5 is not located on the creek itself but on an irrigation ditch, it diverts water from Montezuma Creek upstream of the millsite and is representative of upgradient conditions.

Downstream water quality within Montezuma Creek has been sampled at several locations, including the W-4 site, located approximately 100 meters (325 feet) downstream of the east boundary of the property; the Sorenson site, located approximately 2 kilometers (1.25 miles) downstream of the millsite; and the Montezuma Canyon site, located approximately 10 kilometers (6 miles) downstream of the millsite (Figure 11). As the creek flows across the millsite, concentrations of molybdenum, selenium, uranium, and gross alpha activity increase within the creek, suggesting that contributions from the contaminated alluvial aquifer increase in a downstream direction. Seeps from the shallow aquifer are visible along the creek downstream of the eastern

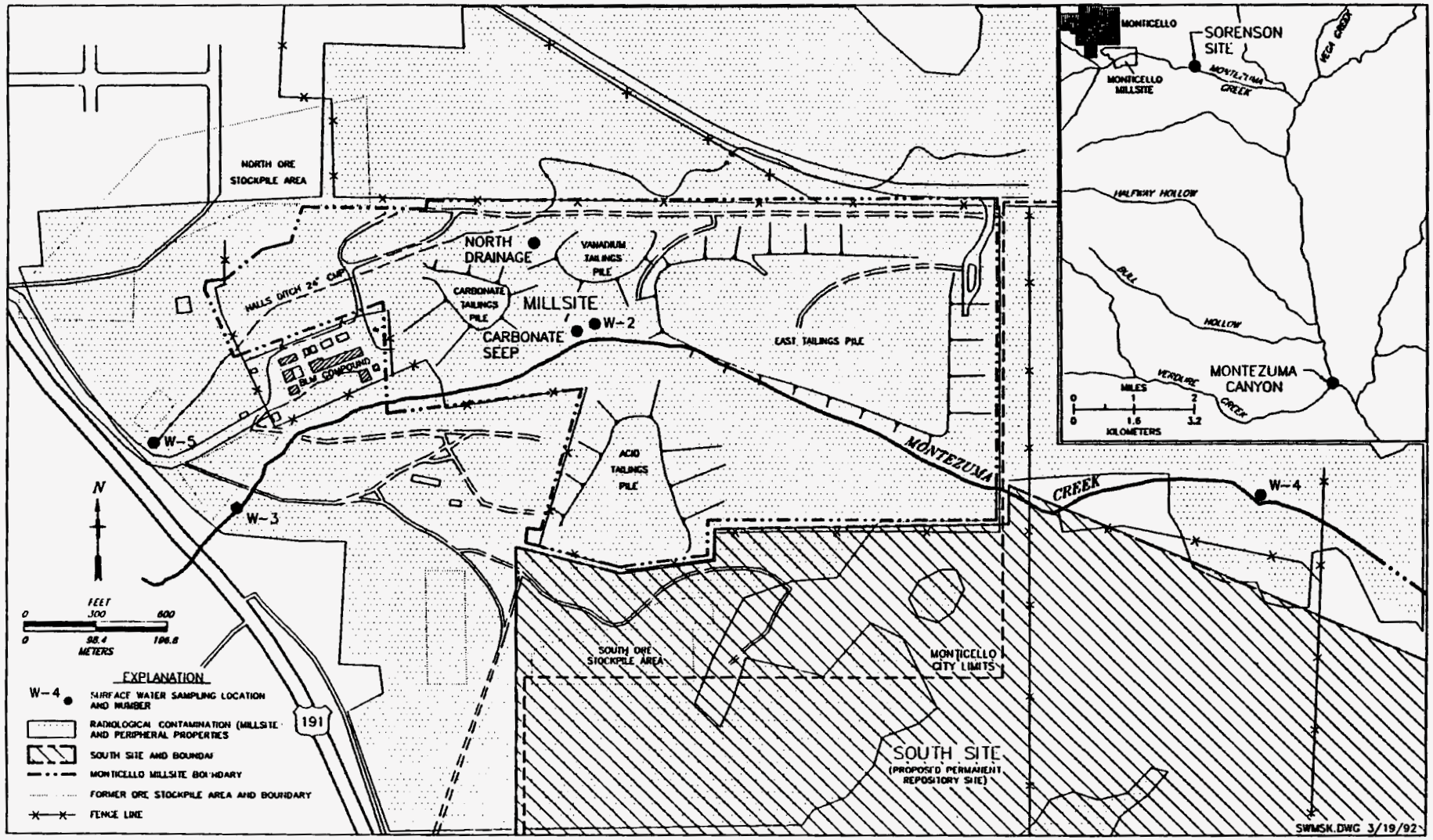

Figure 11. Surface Water Sampling Locations At and Near the Monticello Millsite

millsite boundary, and creek discharge increases throughout this section for approximately 2 kilometers (1.25 miles). Historical assessments of water quality data indicate that the highest concentrations of mill-tailings-related constituents occur at the W-4, and sometimes the Sorenson, site. Historical water quality within Montezuma Creek is described in detail in the RI/FS--EA (UNC Geotech 1990).

State of Utah regulations (Title 26, Chapter 11, Utah Code Annotated) has placed the segment of Montezuma Creek that flows through and below the millsite into four use classifications. These classifications, which include (1) Domestic Source 1C, (2) Recreation and Aesthetics 2B, (3) Agriculture, and (4) Aquatic Wildlife 3B, are associated with specific numeric standards. The most stringent standards associated with analytes that are sampled for within Montezuma Creek are listed in Table 4. Montezuma Creek water is used as a source of municipal water supply about 1.6 kilometers (1 mile) upstream of the tailings area. Downstream of the tailings area, surface water is used primarily for stock watering.

Several seeps and ponds on the millsite contain water that has been contaminated by contact with uranium mill tailings. Like the ground water (see Ground Water Protection Program section in this report), these surface waters often contain higher-than-background levels of uranium, radium-226, gross alpha, arsenic, molybdenum, selenium, and vanadium. Permanent surface water bodies consist of the drainage between the Carbonate and Vanadium tailings piles (drainage designated W-2 in Figure 11) and the seep-fed pond adjacent to the Carbonate tailings pile (designated Carbonate Seep in Figure 11). This pond, which covers approximately 12.5 square meters (15 square yards), typically is the only one of the seeps on the millsite that contains water during the dry season.

Several intermittent surface water bodies exist on the millsite, mostly in the form of seeps adjacent to the tailings piles. The only intermittent source sampled is located in a "low spot" between the Carbonate and Vanadium tailings piles (designated as North Drainage in Figure 11). It receives both surface runoff and seeping ground waters.

Surface water monitoring during the past 10 years at and near the Monticello Millsite has provided an extensive body of baseline data. Because of this, monitoring activities from 1987 to present have been reduced from those of previous years, the primary goals having been 1) to verify compliance/noncompliance with state surface water quality standards, and 2) to detect changes in water quality once remedial action begins. Locations sampled in 1991 included those designated in Figure 11 as W-3 and W-5, which represent upgradient conditions on Montezuma Creek; W-2, North Drainage, and the Carbonate Seep, which represent on-site surface water conditions; and W-4, Sorenson, and Montezuma Canyon sites, which represent downgradient conditions within Montezuma Creek. Sites designated as W-3 and the North Drainage were dry during the October sampling period and were only sampled during the April period. All other sites

Table 4. Comparison of State of Utah Water Quality Standards[a] to 1991 and Historical Maximum Concentrations Within Montezuma Creek

Constituent	State Standard		1991 Maximum[b,c] Up-Gradient	1991 Maximum[b,c] Down-Gradient	Historical Maximum[c,d] Up-Gradient	Historical Maximum[c,d] Down-Gradient
Physical						
pH	6.5-9.0	Units	7.8-8.3	6.7-8.2	6.6-9.2	7.1-8.6
Metals(acid soluble)[e]						
Arsenic	0.05	mg/L	<0.01	0.010	<0.01	0.027
Barium	1.0	mg/L	ND	ND	<0.01	0.12
Cadmium	0.01	mg/L	ND	ND	<0.005	<0.001
Chromium	0.05	mg/L	ND	ND	<0.005	<0.005
Copper	0.2	mg/L	ND	ND	ND	ND
Iron	1.0	mg/L	ND	ND	0.10	0.15
Lead	0.05	mg/L	ND	ND	0.003	0.001
Mercury	0.002	mg/L	ND	ND	<0.002	<0.002
Selenium	0.01	mg/L	<0.005	0.028	0.007	0.042
Silver	0.05	mg/L	ND	ND	<0.0005	0.002
Inorganics						
Boron	0.75	mg/L	ND	ND	ND	ND
Fluoride	1.4-2.4	mg/L	ND	ND	<1.0	<1.0
Nitrates (as N)	10	mg/L	0.60[f]	1.4[f]	0.7[f]	5.2[f]
Total Dissolved Solids	1200	mg/L	ND	ND	ND	ND
Radiological						
Gross Alpha	15	pCi/L	<26	370	17	517
Radium-226+228	5	pCi/L	3.3[g]	0.5[g]	<1.0	<3.0
Gross Beta	50	pCi/L	ND	ND	ND	ND
Organics						
2,4-D	100	µg/L	ND	ND	ND	ND
2,4,5-TP	10	µg/L	ND	ND	ND	ND
Endrin	0.2	µg/L	ND	ND	ND	ND
Lindane	4	µg/L	ND	ND	ND	ND
Methoxychlor	100	µg/L	ND	ND	ND	ND
Toxaphene	5	µg/L	ND	ND	ND	ND

[a] State of Utah Water Quality Standards for the Montezuma Creek segment, Title 26, Chapter 11, Utah Code Annotated.

[b] An "ND" indicates not determined; a "<" symbol indicates that the maximum concentration was below detection limits (number shown is detection limit).

[c] The listed values are in the units shown under the State Standard column.

[d] Based on maximum concentrations observed from 1984 through 1990.

[e] The acid soluble method as used by the State Health Laboratory involves acidification of the sample in the field, filtration in the laboratory, no digestion process, and analysis by atomic absorption spectrophotometry. The method employed by the Geotech Analytical Chemistry Laboratory is similar except that the sample is filtered in the field before acidification.

[f] Nitrate (as N) values were derived using the following conversion: NO_3 (as N) = $NO_3 \div 4.427$.

[g] Value represents radium-226 only; radium-228 concentrations were below detection limits.

were sampled in both April and October for the following analytes: gross alpha, radium-226, radium-228, uranium-234, uranium-238, thorium-230, arsenic, molybdenum, nitrate, selenium, and vanadium. Alkalinity, pH, and specific conductance were measured in the field.

Upgradient surface water quality at sites W-3 and W-5 in 1991 was characterized by low concentrations of mill-tailings-related contaminants and an average pH of 8.08, an average specific conductance of 726 micromhos per centimeter (μmhos/cm), and an average alkalinity of 239 milligrams per liter (mg/L) (as $CaCO_3$). These concentrations were slightly lower than those in 1990, probably because of increased runoff.

Analyses of downgradient samples from the W-4, Sorenson, and Montezuma Canyon sites revealed that concentrations of mill-tailings-related contaminants, except for radium-226, were consistently higher than upgradient concentrations during 1991. Maximum downgradient concentrations for arsenic, selenium, gross alpha, and uranium-234+238 were 0.010 mg/L, 0.028 mg/L, 370 pCi/L, and 400 pCi/L, respectively. Maximum upgradient concentrations were <0.01 mg/L, <0.005 mg/L, <26 pCi/L, and 9.7 pCi/L, respectively (Table 4 and Tables A-14 and A-15 in Appendix A).

A comparison of data from Montezuma Creek samples collected from 1984 through 1990 to state of Utah surface water standards is in Table 4. Historical upgradient surface water samples have exceeded state of Utah standards only with respect to gross alpha, and historical downgradient samples have exceeded standards with respect to selenium and gross alpha. In 1991, no upgradient measurements exceeded state standards except for gross alpha activity, which may or may not have exceeded the 15 pCi/L standard. The detection limit for that analysis was above the standard at 26 pCi/L. Downgradient measurements for both selenium and gross alpha exceeded state standards.

Plots showing the concentrations of selenium and gross alpha over time at upgradient and downgradient locations are presented in Figures 12 through 19. Since 1985, selenium concentrations consistently have been below the state standard at the upgradient (W-5) location (Figure 12). At the W-4 and Sorenson Site locations, which are 0.1 and 2 kilometers downstream of the millsite, respectively, the state standard has been exceeded regularly (Figures 13 and 14). Ten kilometers downstream of the millsite, at the Montezuma Canyon location, selenium concentrations again are consistently below the state standard (Figure 15).

A similar relationship between locations and concentrations exists for gross alpha. Concentrations below detection limits occur at the W-5 and Montezuma Canyon locations, and concentrations above the state standard occur at the W-4 and Sorenson Site locations (Figures 16 through 19).

Contaminant concentrations in samples from on-site ponds and seeps generally were higher than contaminant concentrations in Montezuma Creek samples. (Because the

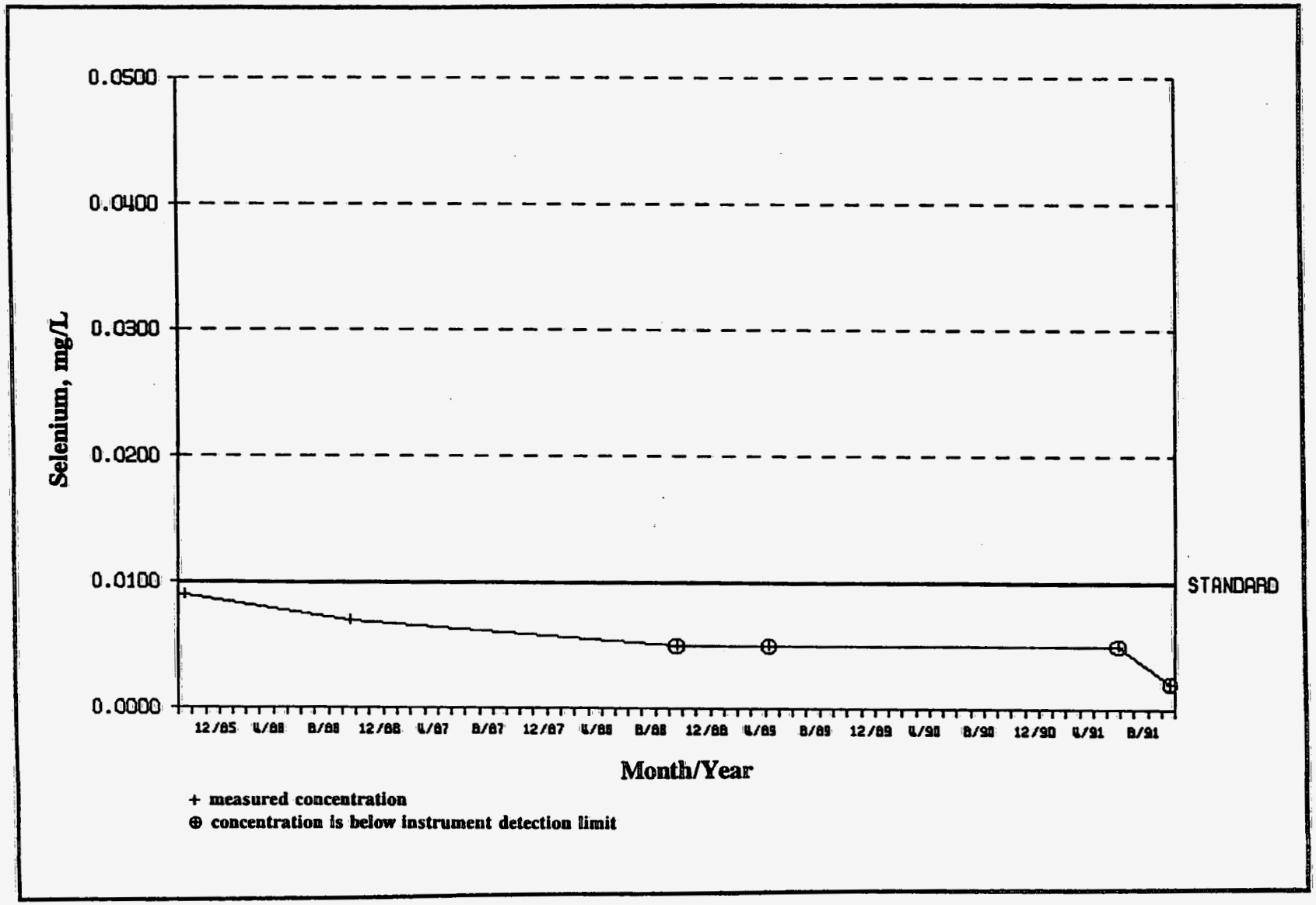

Figure 12. Selenium Concentrations at W-5 (Upgradient) From October 1985 Through December 1991

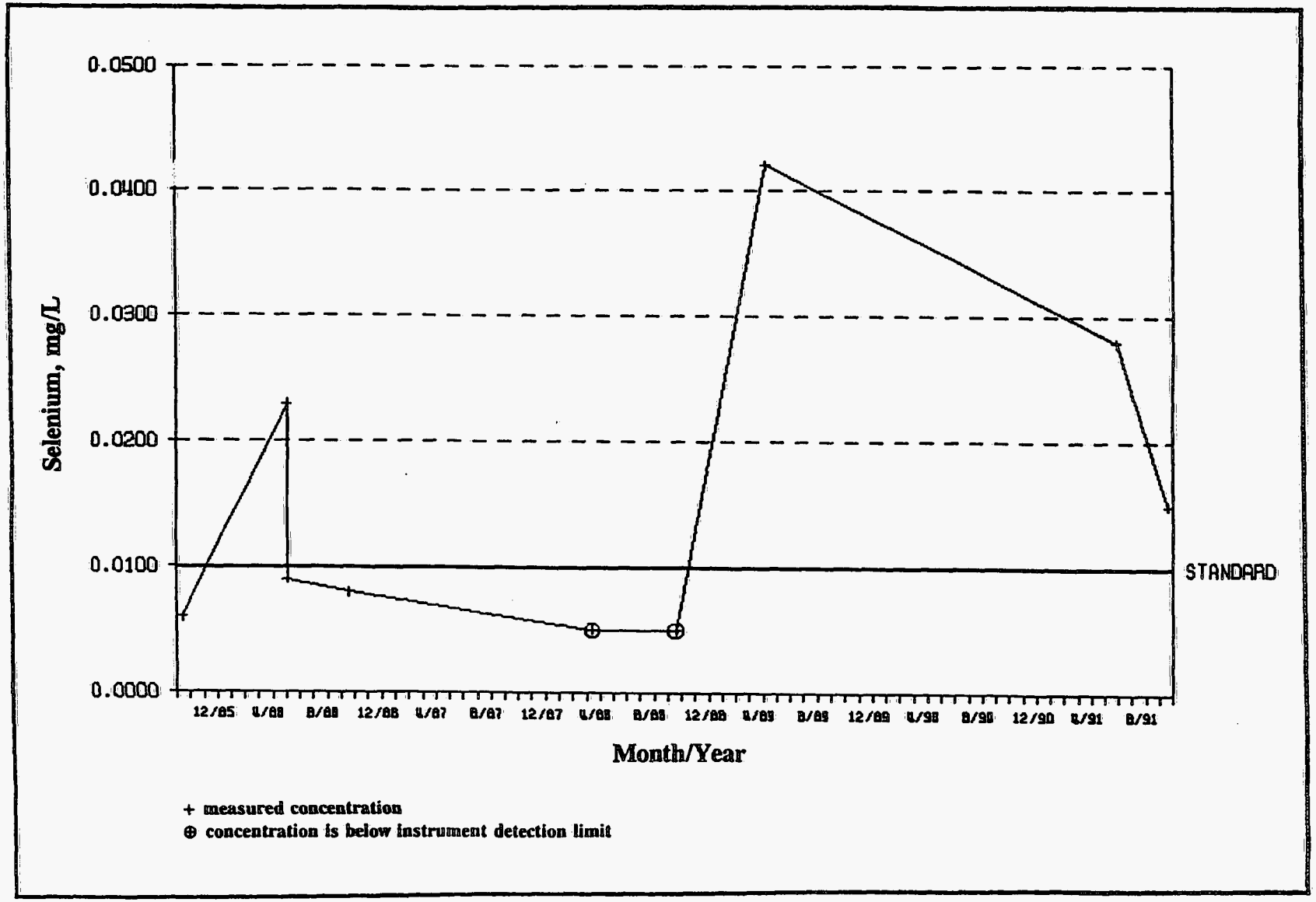

Figure 13. Selenium Concentrations at W-4 (Downgradient) From October 1985 Through December 1991

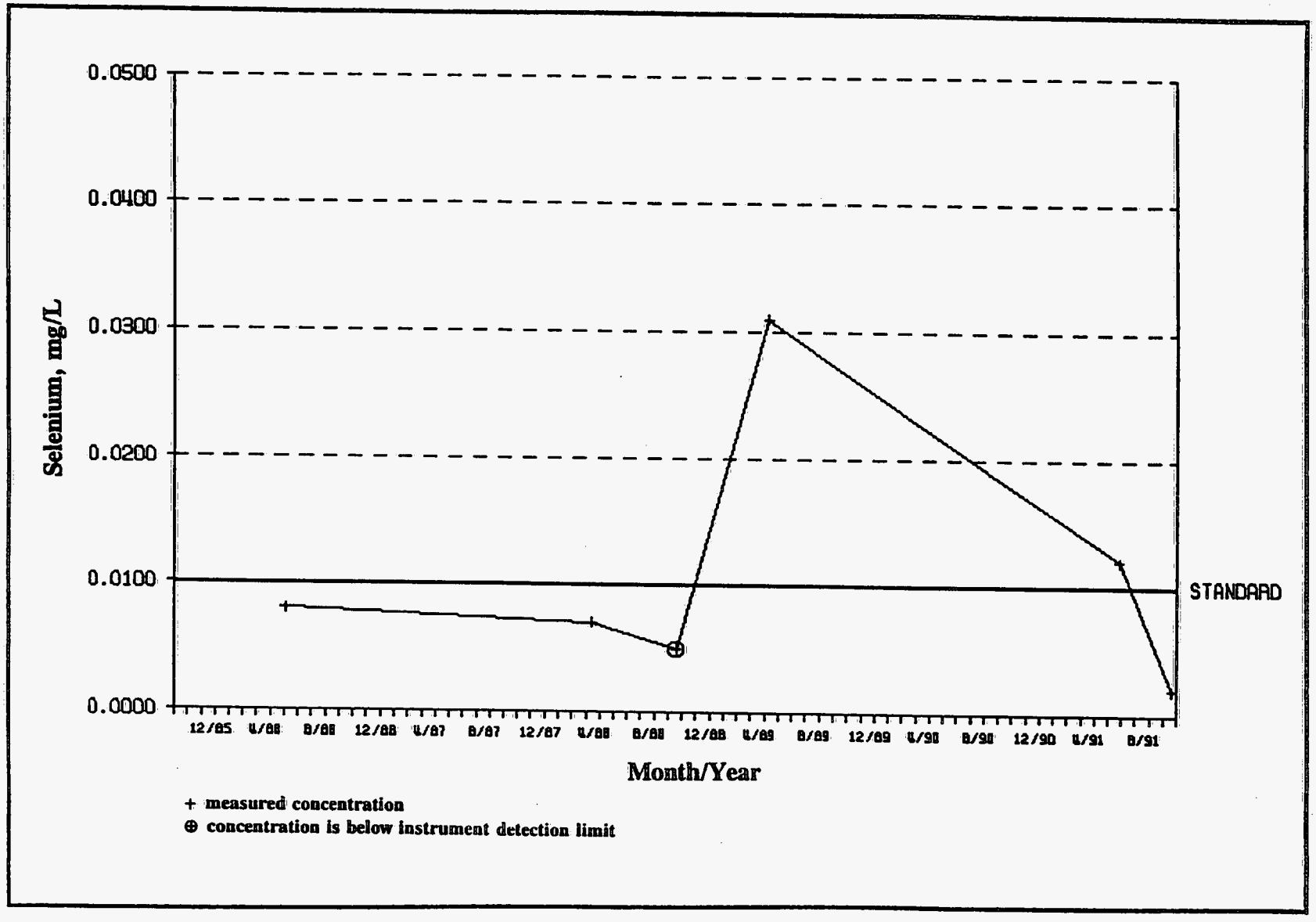

Figure 14. Selenium Concentrations at Sorenson Site (Downgradient) From October 1985 Through December 1991

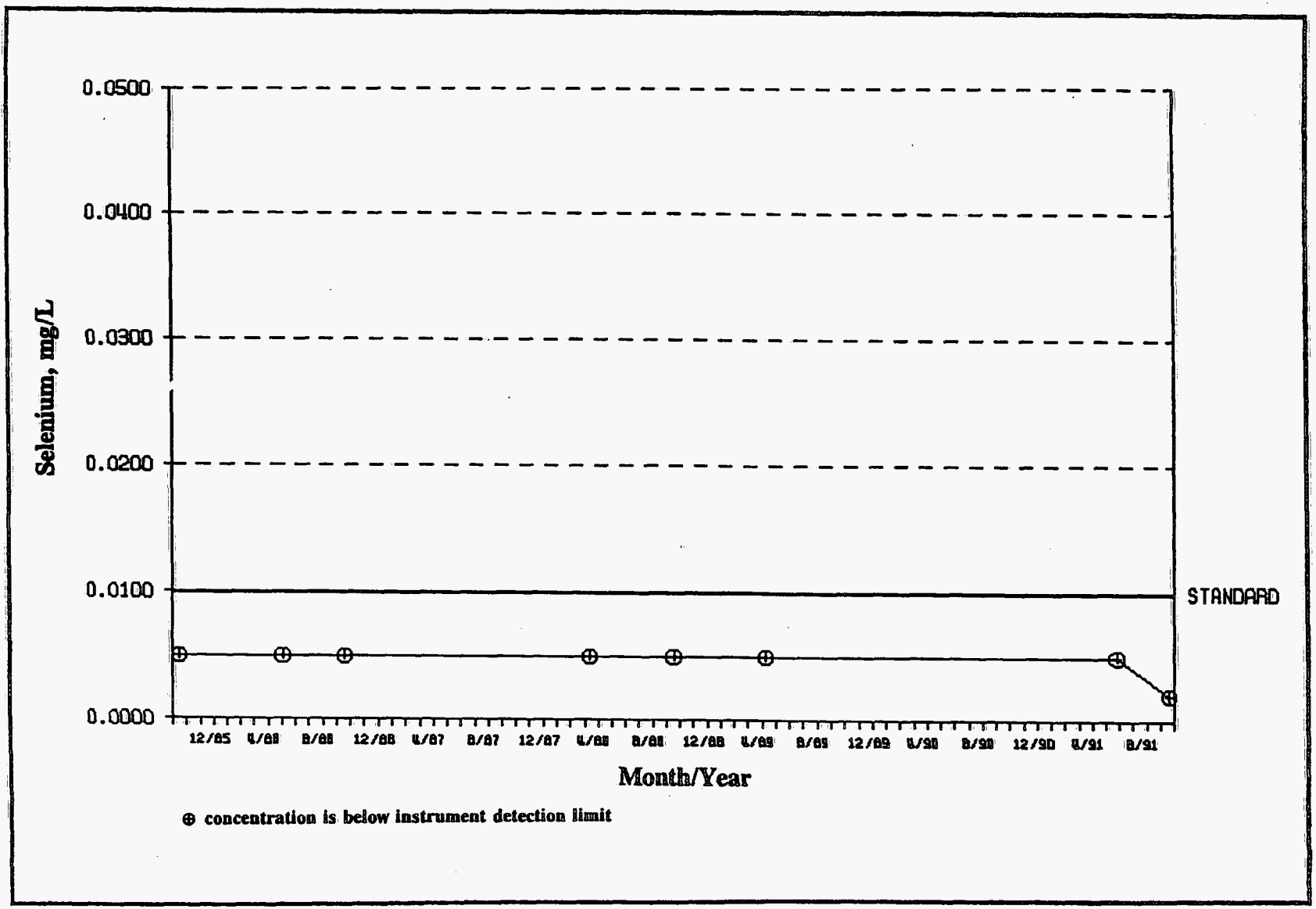

Figure 15. Selenium Concentrations at Montezuma Canyon (Downgradient) From October 1985 Through December 1991

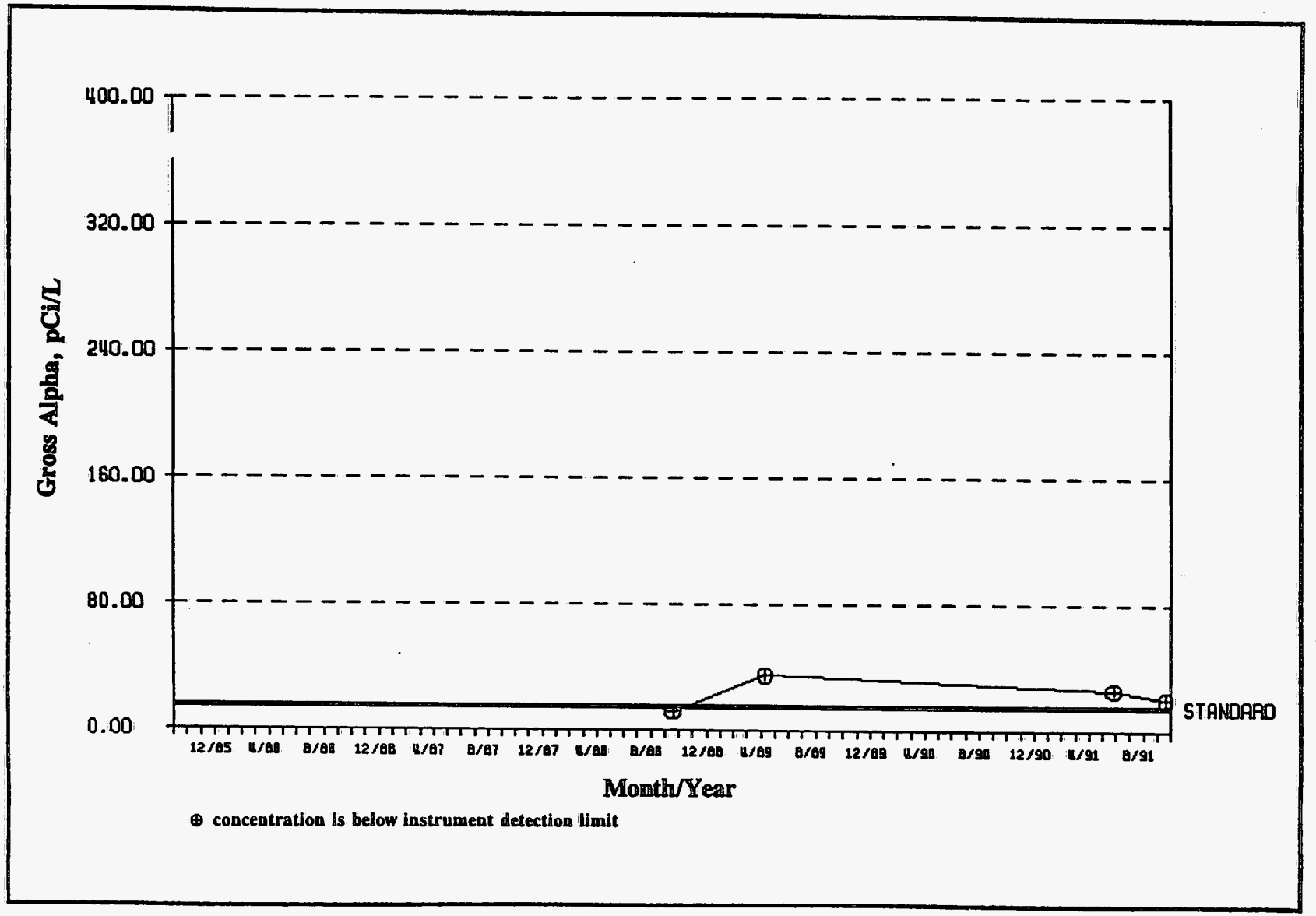

Figure 16. Gross Alpha Concentrations at W-5 (Upgradient) From April 1988 Through December 1991

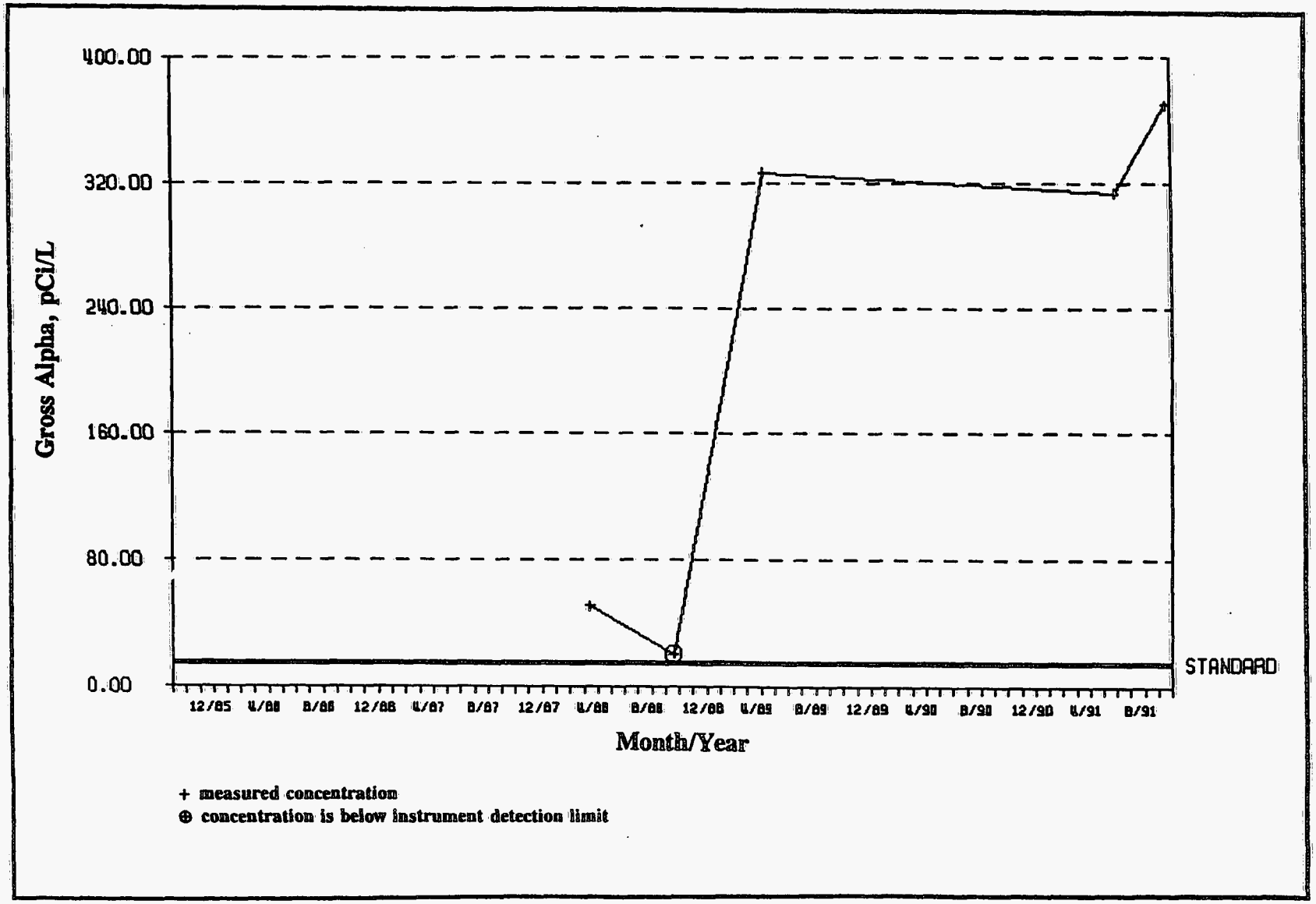

Figure 17. Gross Alpha Concentrations at W-4 (Downgradient) From April 1988 Through December 1991

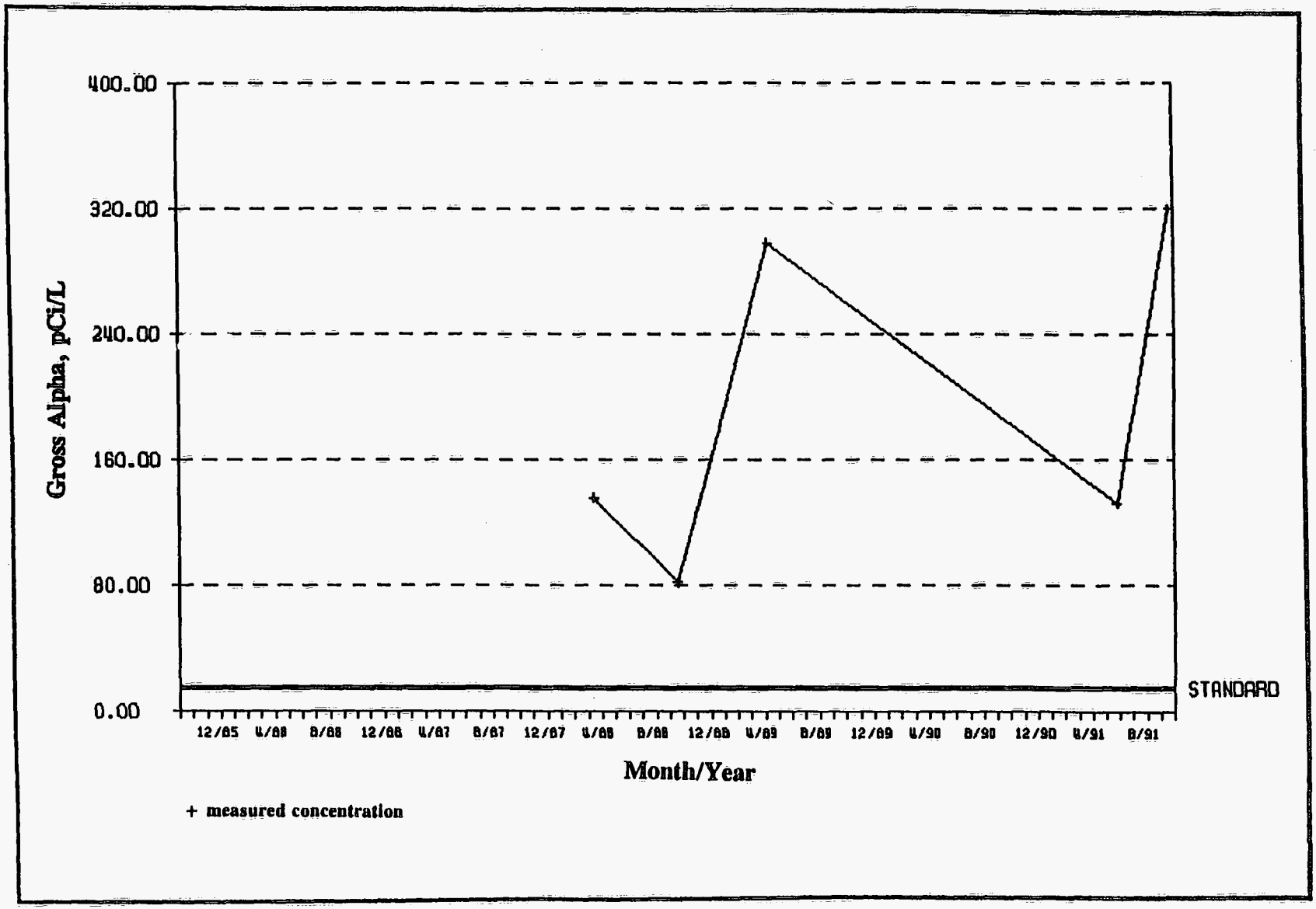

Figure 18. Gross Alpha Concentrations at Sorenson Site (Downgradient) From April 1988 Through December 1991

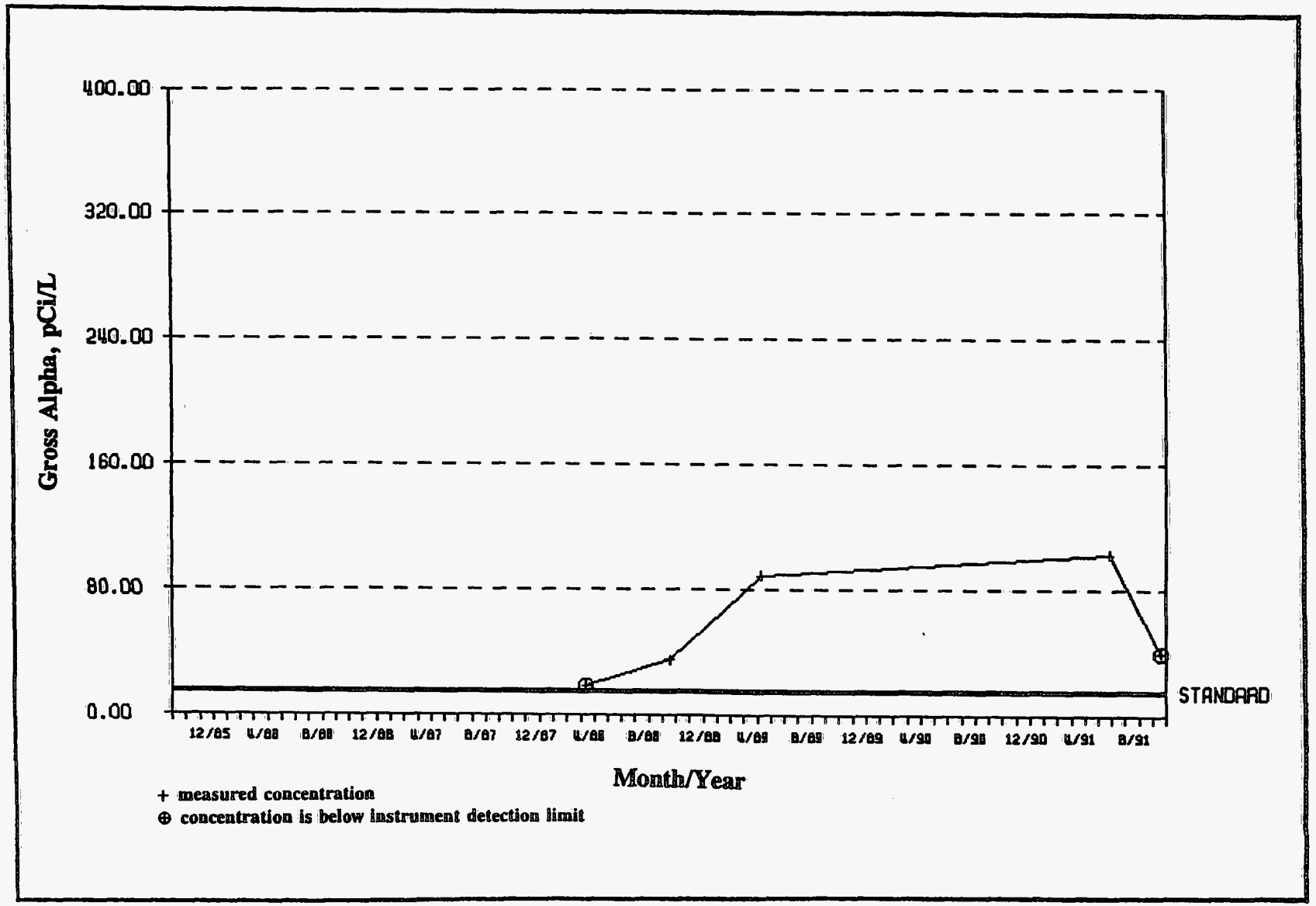

Figure 19. Gross Alpha Concentrations at Montezuma Canyon (Downgradient) From April 1988 Through December 1991

ponds and seeps are surface expressions of the alluvial ground water, concentrations were similar to those in ground water samples collected from wells by the Vanadium and East tailings piles.) Although state surface water standards for Montezuma Creek are not applicable to these water bodies, the standards provide a useful reference for contaminant evaluations. Concentrations of gross alpha, radium-226, arsenic, selenium, nitrate, and pH exceeded state standards for these constituents in at least one of the ponds or seeps (Tables A-14 and A-15, Appendix A). Concentrations of molybdenum and uranium-234+238 also exceeded standards established for ground water (see Ground Water Protection Program section in this report).

ENVIRONMENTAL DOCUMENTS/PERMITS

Key environmental documents initiated or completed in 1991 included the *Draft Final Remedial Design Work Plan* (Chem-Nuclear Geotech, Inc. 1991b) for design of the remedial action at the millsite, the *Draft Environmental Assessment of Additional Lands Proposed for Acquisition for the Monticello, Utah, Uranium Mill Tailings Repository* (Chem-Nuclear Geotech, Inc. 1992b) for aquistion of 800 acres of land adjacent to the millsite, and the *Draft Monticello Surface- and Ground-Water Remedial Action Project CERCLA* Management Plan (Chem-Nuclear Geotech, Inc. 1991a) for the investigation and remediation of Operable Unit III.

There were no environmental permits issued for the Monticello Millsite in 1991 or in prior years. Remedial work at the site is conducted in accordance with the Record of Decision (US-DOE 1990), which was reviewed and approved by the state of Utah and EPA.

ENVIRONMENTAL ACTIVITIES SUMMARY

Geotechnical and engineering evaluations of the proposed Repository Site and Monticello Millsite were conducted in 1991. Work performed at the proposed Repository Site included shallow subsurface water system sampling and subsequent classification to determine the suitability of the site for permanent storage of uranium mill tailings and related contaminated materials. At the Monticello Millsite, 62 boreholes were drilled and completed as monitor wells to determine the vertical extent of contamination. Soil samples were collected and field-screened for organic constituents and analyzed for radionuclides and metals.

ENVIRONMENTAL RADIOLOGICAL PROGRAM INFORMATION

RADIOACTIVE EFFLUENT DATA

The only significant radioactive effluent released from the Monticello Millsite during 1991 was radon-222, which has a half-life of 0.01 years. Based on a radon flux survey conducted in 1984 (UNC Geotech 1990), radon emanates from the millsite at a rate of 1,608 curies per year. Results of the 1991 radiologic air particulate monitoring, which are consistent with previous years results, indicate levels of radiologic air particulates that are well below DCGs.

ENVIRONMENTAL SAMPLING FOR RADIOACTIVITY

Surface water, ground water, and air were sampled on the millsite for radioactive constituents. Surface- and ground-water analytes included radium-226, radium-228, thorium-230, uranium-234, uranium-238, and gross alpha; air was sampled for radon and for particulates containing radium-226, thorium-230, and uranium. Sampling locations, frequency, methodology, and results are discussed under the Environmental Program Information and Ground Water Protection Program sections in this report. Also included in those sections are comparisons of measured constituent levels with their federal and state regulatory levels.

OFF-SITE DOSE MODELING

No off-site dose modeling was conducted during 1991. In the Monticello Millsite RI/FS--EA (UNC Geotech 1990), source terms were calculated for exposure rates, air-particulate concentrations, and radon emissions. Calculated source terms subsequently were used as input to dose commitment models. The models used to estimate dose equivalents expected to be received by Monticello residents included the Atmospheric Transport Model (Raridon and others 1982) and a dosimetric model described by the U.S. Nuclear Regulatory Commission (1980). Site-specific data used in the modeling for calculating population dose commitments were collected from 1981 through 1987. These modeling results, excerpted from the RI/FS-EA (UNC Geotech 1990), are in Table 5.

Monitoring data (air particulates, radon, gamma radiation) collected during 1991, although more limited in scope, were used to calculate the effective dose equivalent (EDE) to the maximally exposed off-site individual near the Monticello Millsite. Because radiological air particulates were indistinguishable from background, radon and direct gamma radiation were the only significant contributors to off-site dose. Calculation of the EDE of the maximally exposed off-site individual living approximately 100 meters north of the site boundary involved a summation of the radon and gamma source terms.

Table 5. Population[a] Dose Commitments to Monticello Residents from Natural Background and Present Enhanced Conditions

Source	Dose Commitment	
	Whole Body	Lung
Natural Background		
Direct External Exposure	316 person-rem/yr (3.16 person-Sv/yr)[c]	NA[b]
Radon Daughters	NA	1265 person-rem/yr (12.65 person-Sv/yr)
Enhanced Conditions (excluding background)		
Direct External Exposure	165 person-rem/yr (1.65 person-Sv/yr)	NA
Radon Daughters	NA	188 person-rem/yr (1.88 person-Sv/yr)

[a]Population assumed to be 2,469.
[b]Not applicable.
[c]Sv/yr = sieverts per year.

The radon source term used in the calculation (0.75 pCi/L) was derived from the kriged contour map of expected radon concentrations around the Monticello Millsite (UNC Geotech 1990). The gamma source term was taken from the nearest off-site environmental TLD (TLD-M-4). Using the conversion 3 pCi/L ≅ 100 mrem/yr (from DOE Order 5400.5) and the 0.75 pCi/L radon value, a dose from radon exposure was calculated as 25 mrem/yr (2.5×10^{-4} sieverts per year). When this dose was combined with the TLD measurement of 31 mrem/yr (exclusive of background), the resulting EDE was 56 mrem/yr (5.6×10^{-4} sieverts per year). This EDE is below the DOE limit of 100 mrem/yr above background. Bakground dose rates in the Monticello area are 119 mrem/yr (1.19×10^{-3} sieverts per year).

ENVIRONMENTAL NONRADIOLOGICAL PROGRAM INFORMATION

NONRADIOLOGICAL EFFLUENT DATA

No nonradiological effluent was released from the Monticello Millsite during 1991.

ENVIRONMENTAL SAMPLING FOR NONRADIOLOGICAL POLLUTION

Surface water, ground water, and air particulates emanating from the uranium mill tailings piles were sampled for a variety of nonradiological constituents on the Monticello Millsite. These sampling programs are described in the Environmental Program Information and Ground Water Protection Program sections of this document. Comparisons of measured constituent levels with federal and state regulatory levels also are contained in those sections.

SARA, TITLE III, REPORTING

No SARA, Title III, reporting was required at the inactive Monticello Millsite.

GROUND WATER PROTECTION PROGRAM

HYDROGEOLOGY

There are two aquifers underlying the Monticello Millsite and surrounding area. Unconsolidated materials deposited by Montezuma Creek constitute an alluvial aquifer along the valley bottom. An underlying sandstone aquifer, the Burro Canyon Formation, is separated from the alluvial aquifer by the Mancos Shale Formation (in places) and/or by fine-grained units of the Dakota Sandstone Formation, both of which act as aquitards in the project area (Figure 20).

The alluvial aquifer is approximately 5 meters (16 feet) thick near Montezuma Creek and thins gradually toward the valley sides. Montezuma Creek is in hydraulic communication with the alluvial aquifer on the upstream side of the East tailings pile. However, because of a realignment of the stream channel, the alluvial aquifer and Montezuma Creek are separated in the vicinity of the East tailings pile. The creek and the aquifer are reunited downstream of the East tailings pile.

Recharge of the alluvial aquifer is from infiltration of precipitation and surface water. Like the local surface waters, water levels within the aquifer fluctuate seasonally. The alluvial aquifer discharges contaminated ground water into Montezuma Creek. Ground water flow in the aquifer is estimated to be approximately 113,550 to 132,475 liters (30,000 to 35,000 gallons) per day underneath the East tailings pile. Hydraulic conductivities are highly variable between wells, with values ranging from 3.5×10^{-6} to 7.1×10^{-3} centimeters per second (0.01 to 20 feet per day) (UNC Geotech 1990). As alluvial ground water moves across the site, it is degraded by constituents such as uranium, vanadium, radium, sulfate, selenium, and molybdenum, which are leached from the mill tailings. Generally, ground water flow direction is to the east and southeast. Water from the alluvial aquifer presently is not used in the vicinity of the millsite.

The Burro Canyon Formation is a confined aquifer in the millsite area that is separated from the alluvial aquifer by an aquitard consisting of the Mancos Shale Formation, where it has not been eroded, and fine-grained units of the Dakota Sandstone Formation. The Burro Canyon aquifer is recharged through the tilted, exposed area of the formation located along the margin of the Abajo Dome west of the millsite. Discharge from the aquifer occurs across the Great Sage Plain, along erosional margins, and in areas where canyons dissect the formation. Numerous stock ponds and marshy areas are created as a result of spring-fed discharge from the aquifer.

To date, analysis of ground water samples indicates that the Burro Canyon aquifer is not being degraded by the tailings piles. Water in the Burro Canyon aquifer is used as a domestic water supply source in the Monticello area.

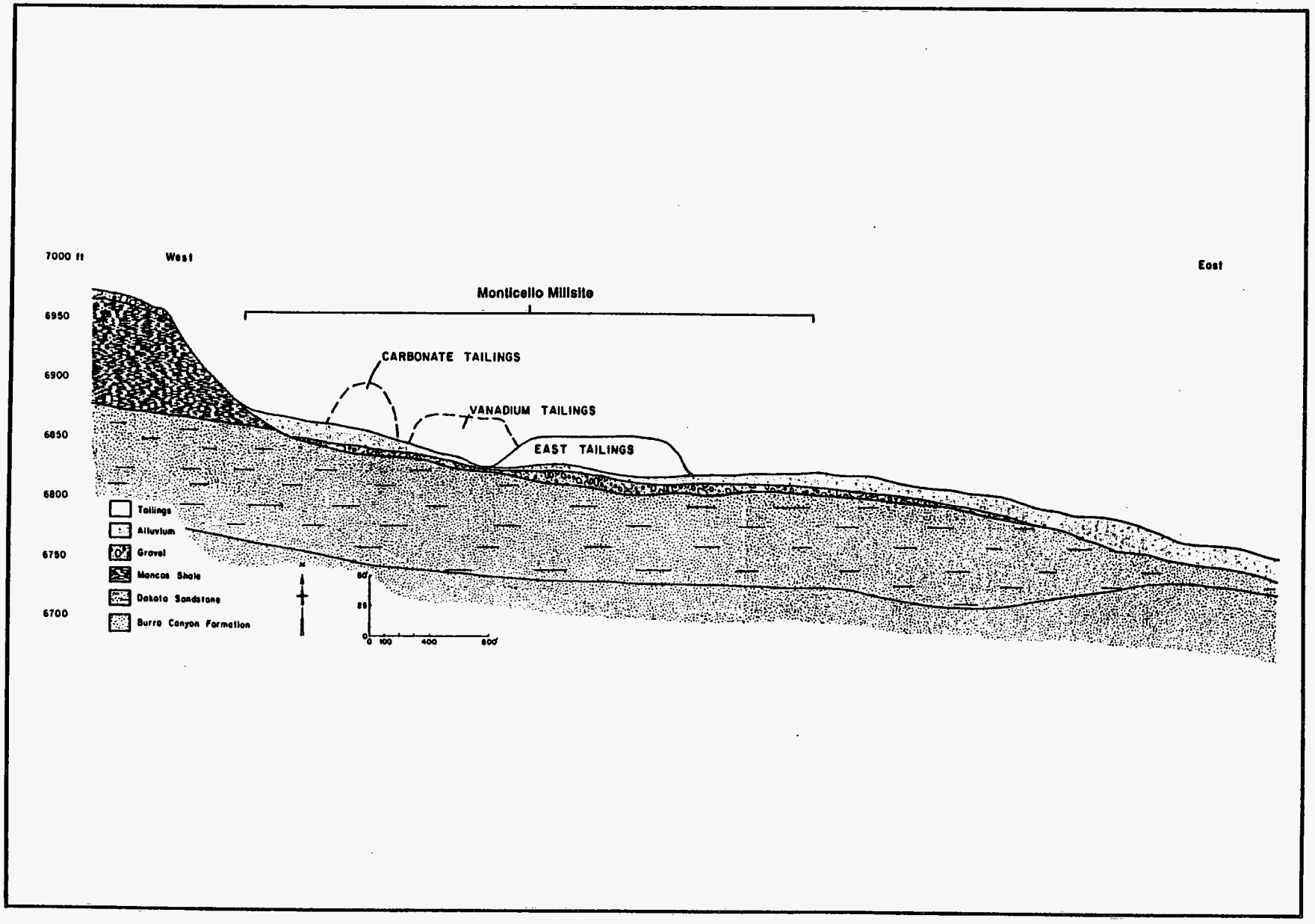

Figure 20. Generalized West-East Cross Section Through the Monticello Millsite

GROUND WATER MONITORING PROGRAM

The objectives of the ground water monitoring program at the Monticello Millsite have been to (1) determine the baseline water quality and quantity conditions of the shallow alluvial aquifer underlying the site, (2) characterize the type and extent of contamination within the aquifer, (3) verify compliance with federal and state ground water quality standards, and (4) detect changes in water quality resulting from remedial action at the site. Monitoring programs conducted since 1980 on 55 upgradient, on-site, and downgradient wells have resulted in estimations of baseline conditions and characterizations of inorganic contaminant types within the ground water; current monitoring focuses on characterizing the alluvial aquifer for organic compounds and meeting the latter two objectives. To verify compliance with federal and state standards, measured water quality values are compared to federal standards promulgated by the Uranium Mill Tailings Radiation Control Act (UMTRCA) and state standards promulgated by Title 26, Chapter 11, of the Utah Code Annotated. The numeric standards applicable to the millsite are listed in Table 6 (Table 6 combines federal and state standards into one list for comparison purposes; federal standards are listed separately in 40 CFR 192.12).

Ground water samples were collected from the alluvial and Burro Canyon aquifers at the Monticello site in April and October of 1991 with a peristaltic pump, a bladder pump, polyethylene disposable bailer, or a teflon bailer, depending on individual well conditions and analytes sampled. Alluvial well samples analyzed for inorganic constituents were collected from two upgradient wells (82-20 and 82-43), seven on-site wells (82-30B, 82-31B-E, 82-36A, 82-40A, 82-45B, 82-51, 82-52), and one downgradient well (82-08) (see Figures 21 and 22 for well locations). One well completed in the Burro Canyon aquifer (84-74) was sampled for inorganic constituents. Alluvial well samples analyzed for organic constituents were collected from three upgradient wells (82-43, 82-44, and 86-78), seven on-site wells (82-30B, 82-30C, 82-31BE, 82-36A, 82-40A, 82-45B, and 82-52), and one downgradient well (88-87). Samples requiring filtration were run through a 0.45-μm filter in line with the collection vessel. Samples were then preserved and analyzed according to procedures prescribed in the *Analytical Chemistry Laboratory Handbook of Analytical and Sample-Preparation Procedures* (Chem-Nuclear Geotech, Inc. 1991c). In Table 6, 1991 and historical maximum concentrations are listed and compared to federal and state ground water standards. Analytical results of all 1991 well samples are in Tables A-14 and A-15, Appendix A.

Historically, upgradient alluvial aquifer inorganic water quality data have been acquired from wells 82-19, 82-20, 82-43, and 82-44 (Figure 21). Since 1983, concentrations of arsenic, barium, chloride, iron, molybdenum, lead, vanadium, zinc, and radium-226 in these wells have been lower than those in on-site wells. Concentrations of nitrate, selenium, and uranium, at times, have exceeded applicable standards (Table 6). In 1991, only upgradient wells 82-20 and 82-43 were sampled. No measured constituent in these upgradient wells had concentrations above standards. Time versus concentration plots

Table 6. Comparison of Federal[a] and State of Utah[b] Ground Water Quality Standards to 1991 and Historical Maximum Concentrations in the Alluvial Aquifer

Constituent	Federal/State Standard		1991 Maximum[c,d] Up-Gradient	1991 Maximum[c,d] On-Site	1991 Maximum[c,d] Down-Gradient	Historical Maximum[d,e] Up-Gradient	Historical Maximum[d,e] On-Site	Historical Maximum[d,e] Down-Gradient
Physical								
pH	6.5-8.5	Units	6.69-7.19	6.72-7.18	6.29-7.18	6.5-8.6	4.5-12.5	6.0-7.8
Inorganics								
Fluoride	2.4	mg/L	ND	ND	ND	0.20	1.2	0.73
Nitrate (as N)	10.0	mg/L	0.82[f]	6.55[f]	2.69[f]	19.6[f]	36[f]	1.78[f]
Metals								
Arsenic	0.05	mg/L	<0.01	0.127	<0.01	0.01	0.19	0.02
Barium	1.0	mg/L	ND	ND	ND	<0.10	0.85	<0.10
Cadmium	0.01	mg/L	ND	ND	ND	<0.005	0.005	<0.001
Chromium	0.05	mg/L	ND	ND	ND	0.01	0.02	<0.01
Copper	1.0	mg/L	ND	ND	ND	ND	ND	ND
Lead	0.05	mg/L	ND	ND	ND	<0.025	0.025	<0.01
Mercury	0.002	mg/L	ND	ND	ND	0.002	<0.0002	<0.0002
Molybdenum	0.1	mg/L	0.012	0.593	0.016	0.06	116	0.53
Selenium	0.01	mg/L	0.007	0.038	0.034	0.013	0.16	0.038
Silver	0.05	mg/L	ND	ND	ND	<0.025	<0.025	<0.010
Zinc	5.0	mg/L	ND	ND	ND	2.82	1.40	0.47
Radiological								
Radium-226+ 228	5.0	pCi/L	0.2[g]	9.4[g]	0.2[g]	0.20	38.0	<2.0
Gross Alpha (excluding radon and uranium)	15.0	pCi/L	<52	549	<1	15[h]	7280[h]	134[h]
Uranium-234+ 238	30.0	pCi/L	8.6	2466	161	1465[i]	8525[i]	2000[i]

[a]Standards from the Uranium Mill Tailings Radiation Control Act of 1978.

[b]State of Utah Ground Water Quality Standards, Title 26, Chapter 11, Utah Code Annotated.

[c]An "ND" indicates not determined; a "<" symbol indicates that the maximum concentration was below detection limits (number shown is detection limit).

[d]The listed values are in the units shown under the Standard column.

[e]Based on maximum concentrations observed from 1984 through 1990.

[f]Nitrate (as N) values were derived using the following conversion, Nitrate (as N) = $NO_3/4.427$

[g]Radium-228 concentration was below detection limits.

[h]Values represent total gross alpha, including uranium.

[i]Uranium concentrations were actually measured in mg/L, but were converted to pCi/L for comparison purposes. The conversion assumes equilibrium and an activity of 0.666 pCi/µg.

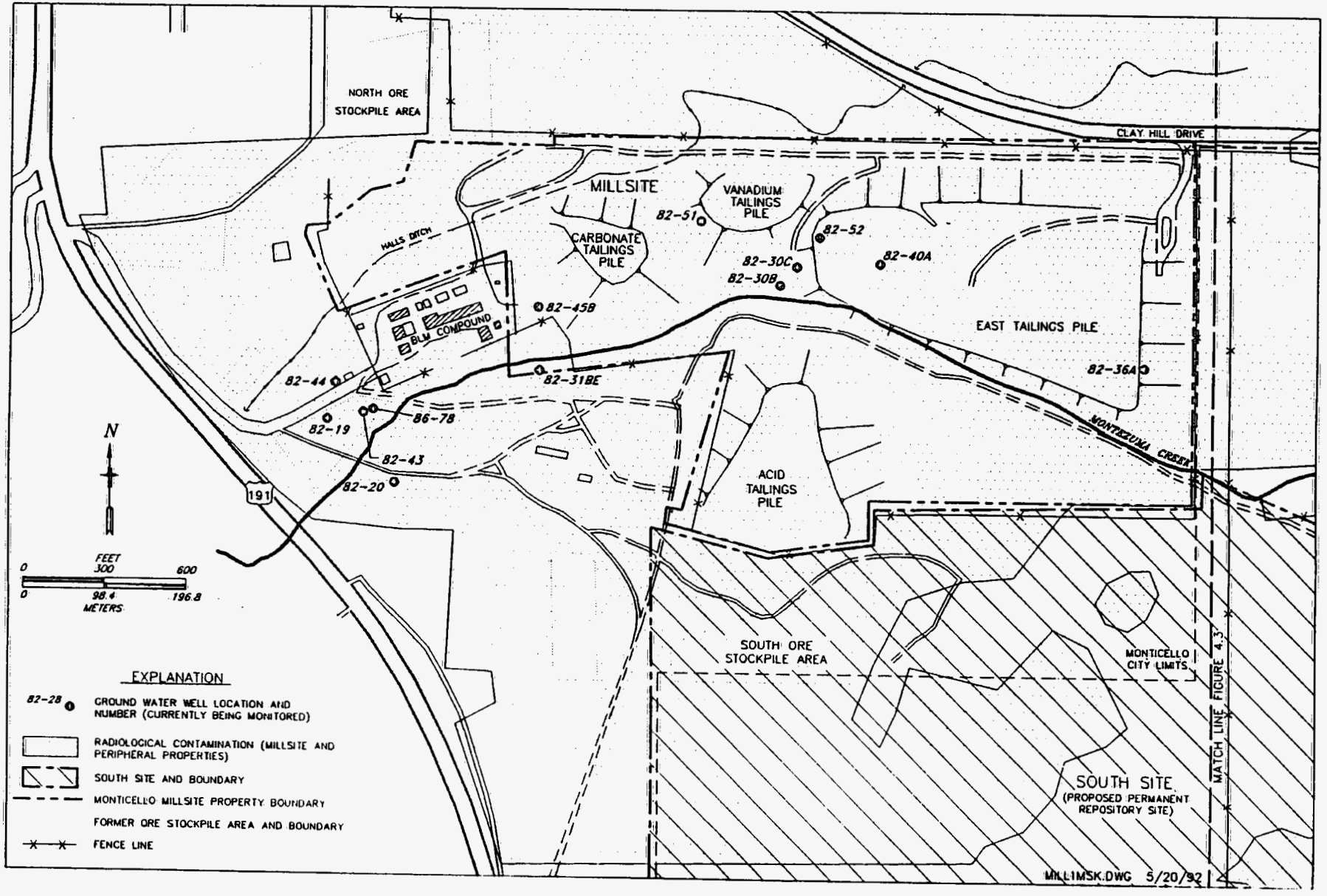

Figure 21. Ground Water Sampling Locations On Site and Upgradient of the Monticello Millsite

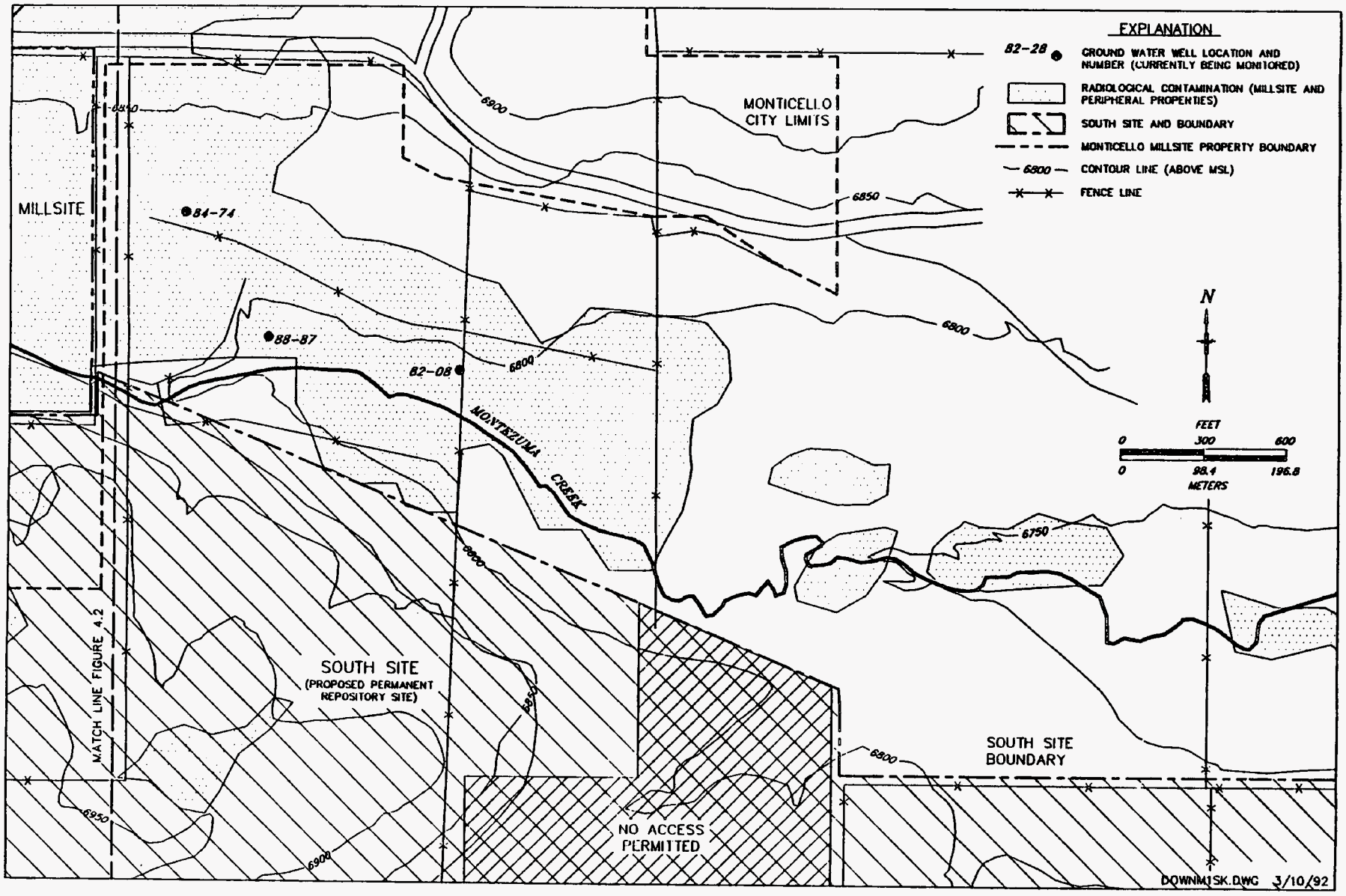

Figure 22. Ground Water Sampling Locations Downgradient of the Monticello Millsite

for arsenic, molybdenum, uranium, and radium in well 82-20 (Figures 23 through 26) illustrate the low concentrations of these constituents over time.

Ground water sampled from the alluvial aquifer on site is contaminated by elements leached from the tailings piles. In general, the highest contaminant concentrations are found in the vicinity of the Vanadium and East tailings piles. Historically, levels of gross alpha, arsenic, molybdenum, nitrate, pH, selenium, uranium-234+238, and radium-226+228 have, at times, exceeded standards (Table 6). In 1991, concentrations of arsenic, selenium, molybdenum, uranium-234+238, gross alpha, radium-226+228 exceeded standards in one or more on-site ground water samples. Time versus concentration plots for arsenic, molybdenum, uranium, and radium-226 in well 82-36A are shown in Figures 27, 28, 29, and 30, respectively. As illustrated by these plots, measured molybdenum, radium-226, and uranium values have consistently exceeded applicable standards through time. In 1991, one sample from well 82-36A exceeded the arsenic standard (0.05 mg/L) with a concentration of 0.055 mg/L.

Downgradient alluvial aquifer monitoring wells on private property east of the Monticello Millsite (Figure 22) have provided evidence of contaminant migration. At times in the past, levels of gross alpha, molybdenum, pH, selenium, and uranium-234+238 have exceeded standards (Table 6). In 1991, gross alpha and uranium-234+238 exceeded federal and state standards in well 82-08. Time versus concentration plots for arsenic, molybdenum, uranium, and radium-226 in well 82-08 are shown in Figures 31, 32, 33, and 34, respectively. Figure 33 demonstrates that uranium concentrations have consistently exceeded the UMTRCA standard of 30 pCi/L in well 82-08.

In contrast, ground water samples collected from a downgradient Burro Canyon Formation well (84-74) during 1991 exceeded no federal or state standards.

Sampling for Target Compound List semivolatiles, volatiles, pesticides/PCBs, and herbicides (listed in Table A-16, Appendix A) in the alluvial aquifer was conducted in December 1991. With the exception of one volatile organic compound, all concentrations of Target Compound List volatiles, semivolatiles, pesticides/PCBs, and herbicides were below detection limits. The one volatile organic compound detected, carbon disulfide, was from well 82-52. The measured concentration of 1 microgram per liter (μg/L) was below the Contract Laboratory Program reporting limit of 5 μg/L.

Semivolatile and volatile compounds that were not on the requested Target Compound List, but were detected, were labeled as tentatively-identified compounds and are listed in Tables A-17 through A-19, Appendix A. Tentatively-identified compounds were labeled as such because the laboratory instrument was not calibrated for that specific compound, resulting in an estimated concentration. Because of the estimated concentrations detected (<64 μg/L), these compounds are not considered potential contaminants in the ground water.

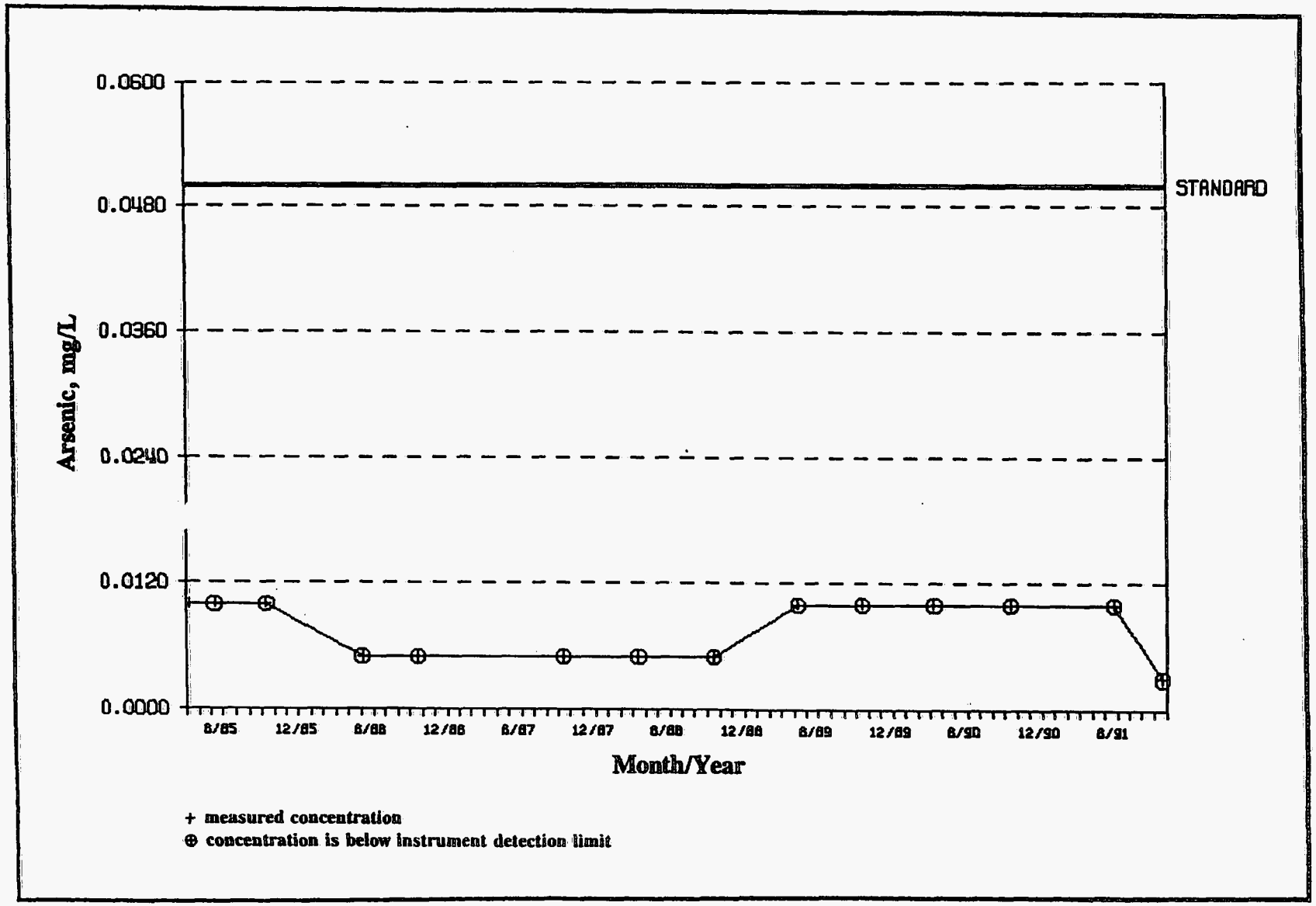

Figure 23. Arsenic Concentrations in Well 82-20 From April 1985 Through October 1991

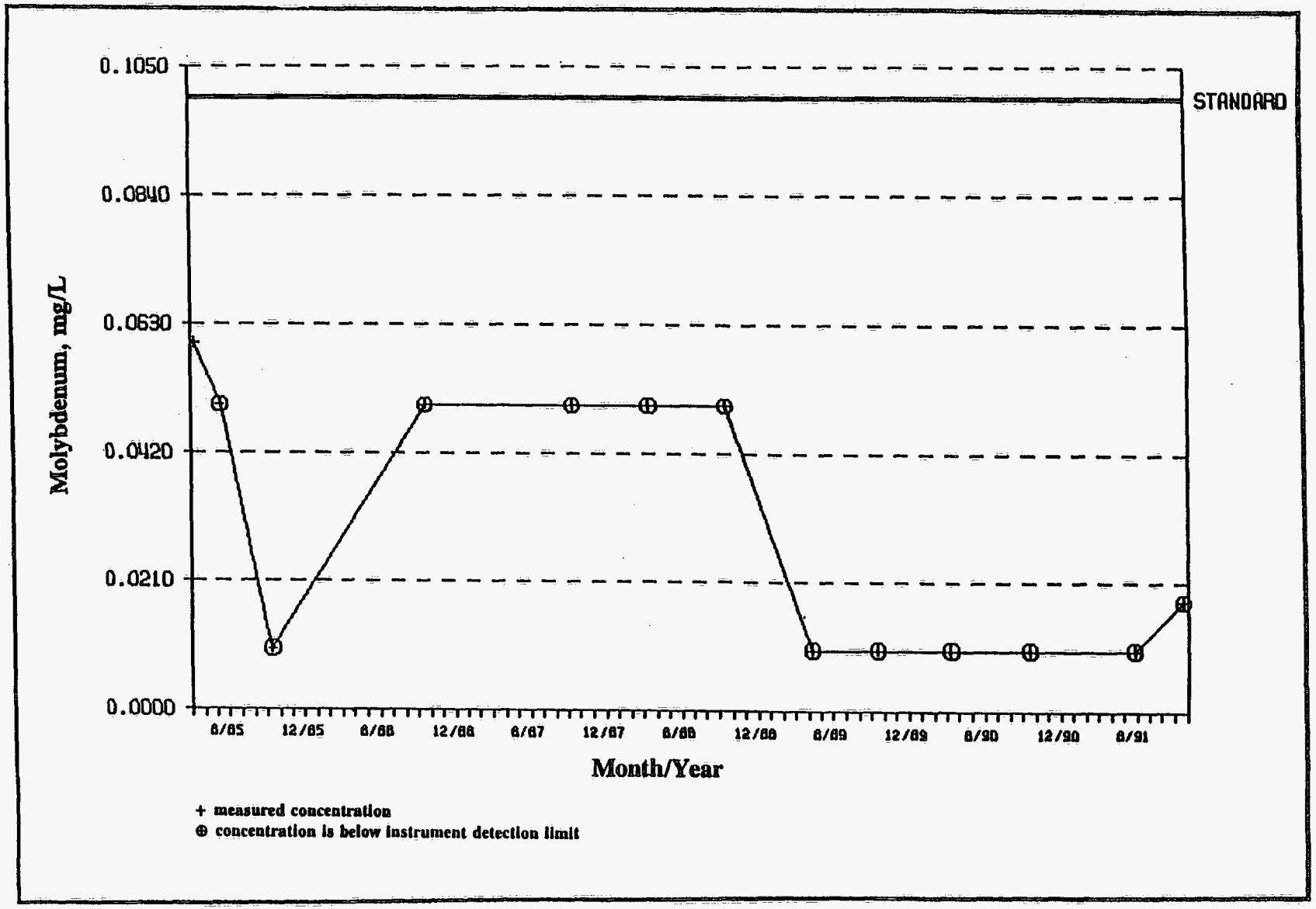

Figure 24. Molybdenum Concentrations in Well 82-20 From April 1985 Through October 1991

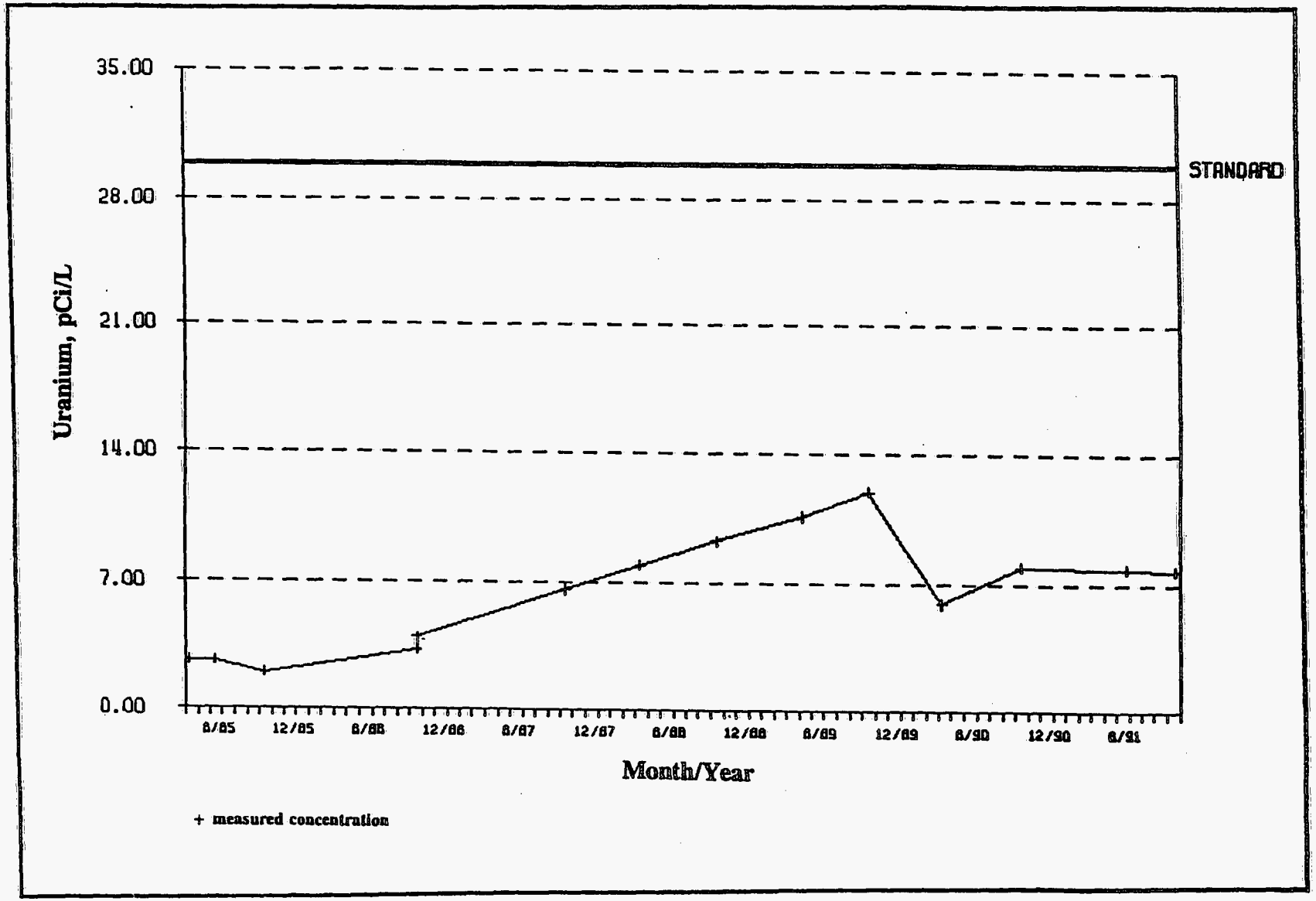

Figure 25. Uranium Concentrations in Well 82-20 From April 1985

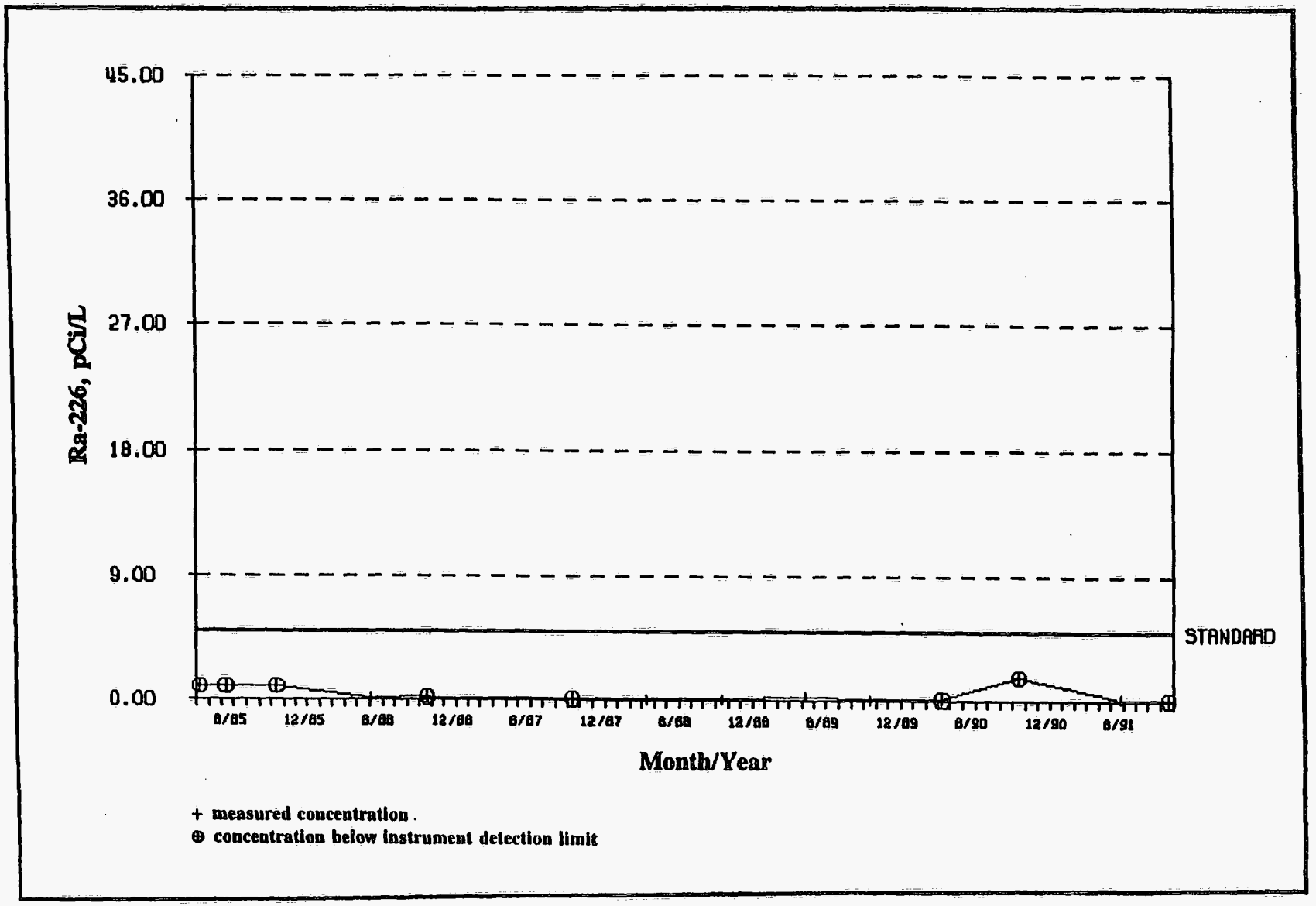

Figure 26. Radium Concentrations in Well 82-20 From April 1985 Through October 1991

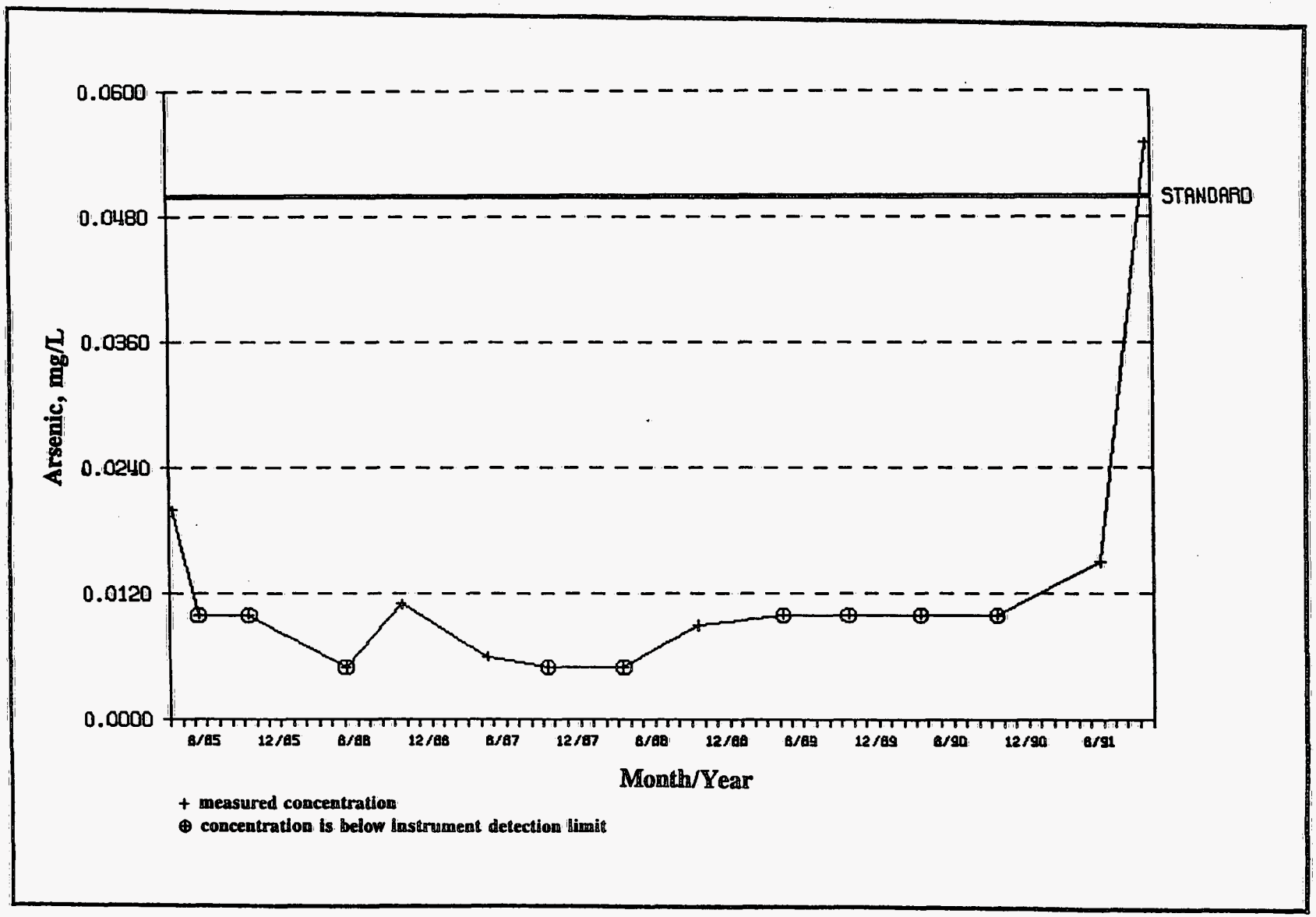

Figure 27. Arsenic Concentrations in Well 82-36A From April 1985 Through October 1991

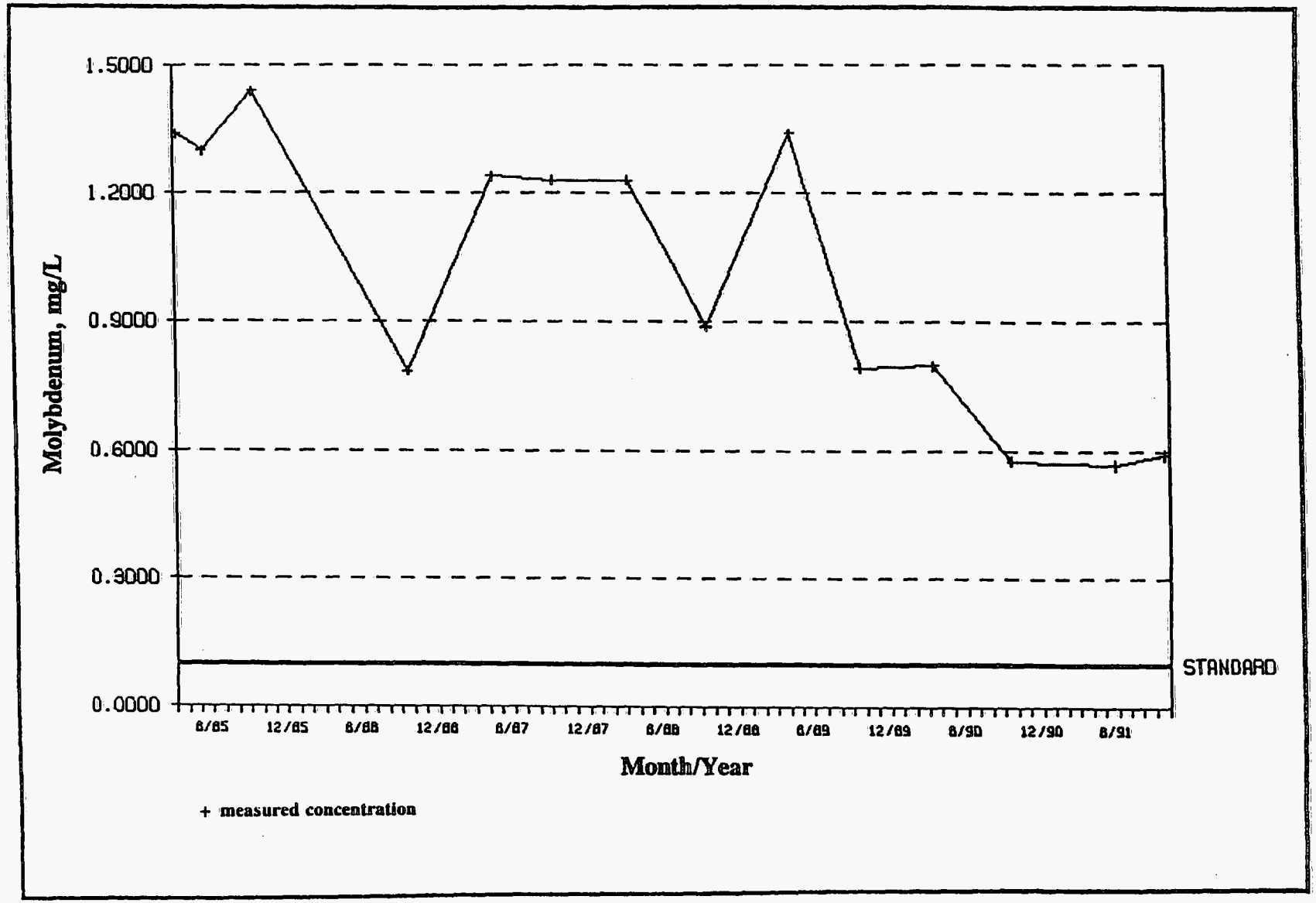

Figure 28. Molybdenum Concentrations in Well 82-36A From April 1985 Through October 1991

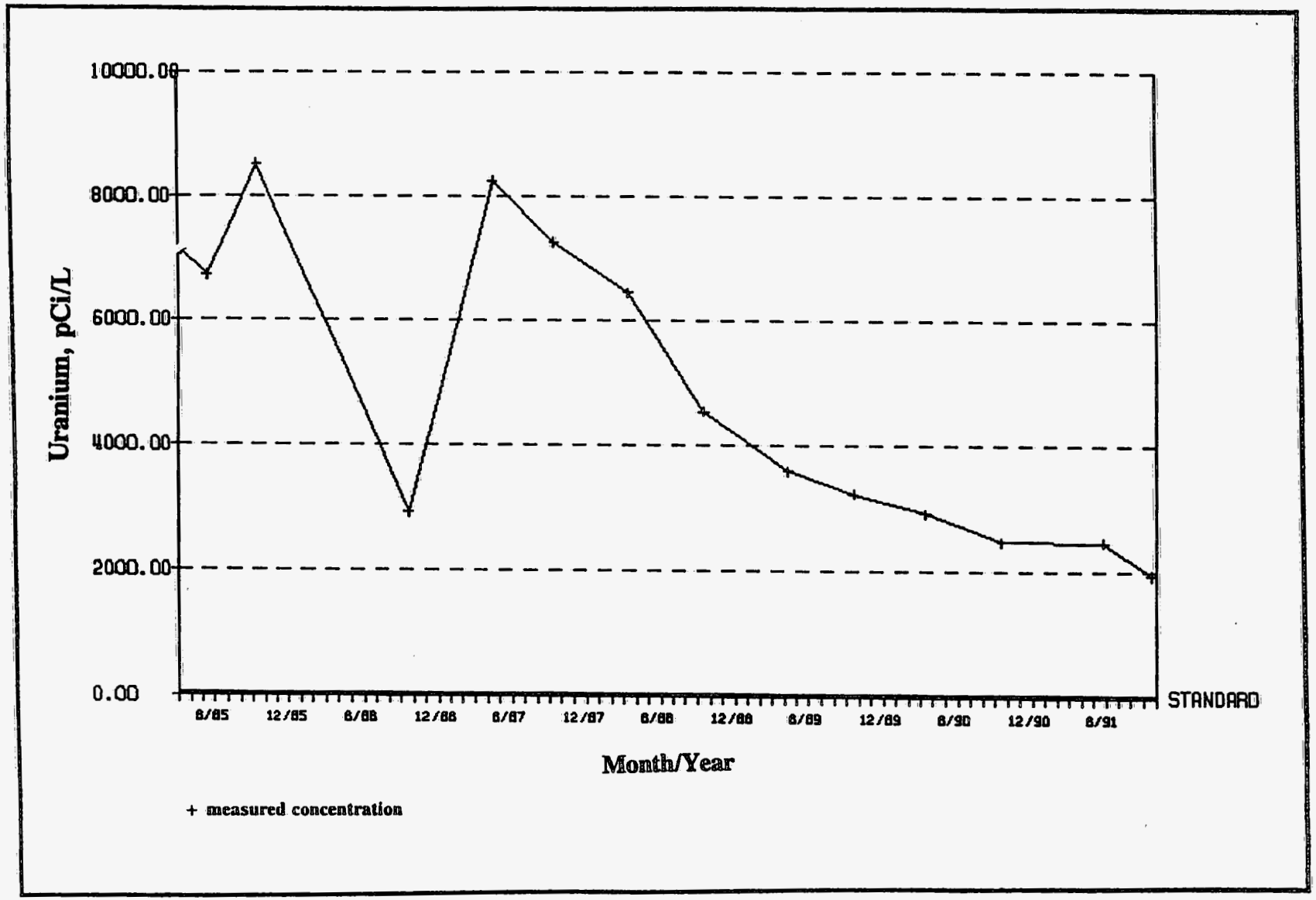

Figure 29. Uranium Concentrations in Well 82-36A From April 1985 Through October 1991

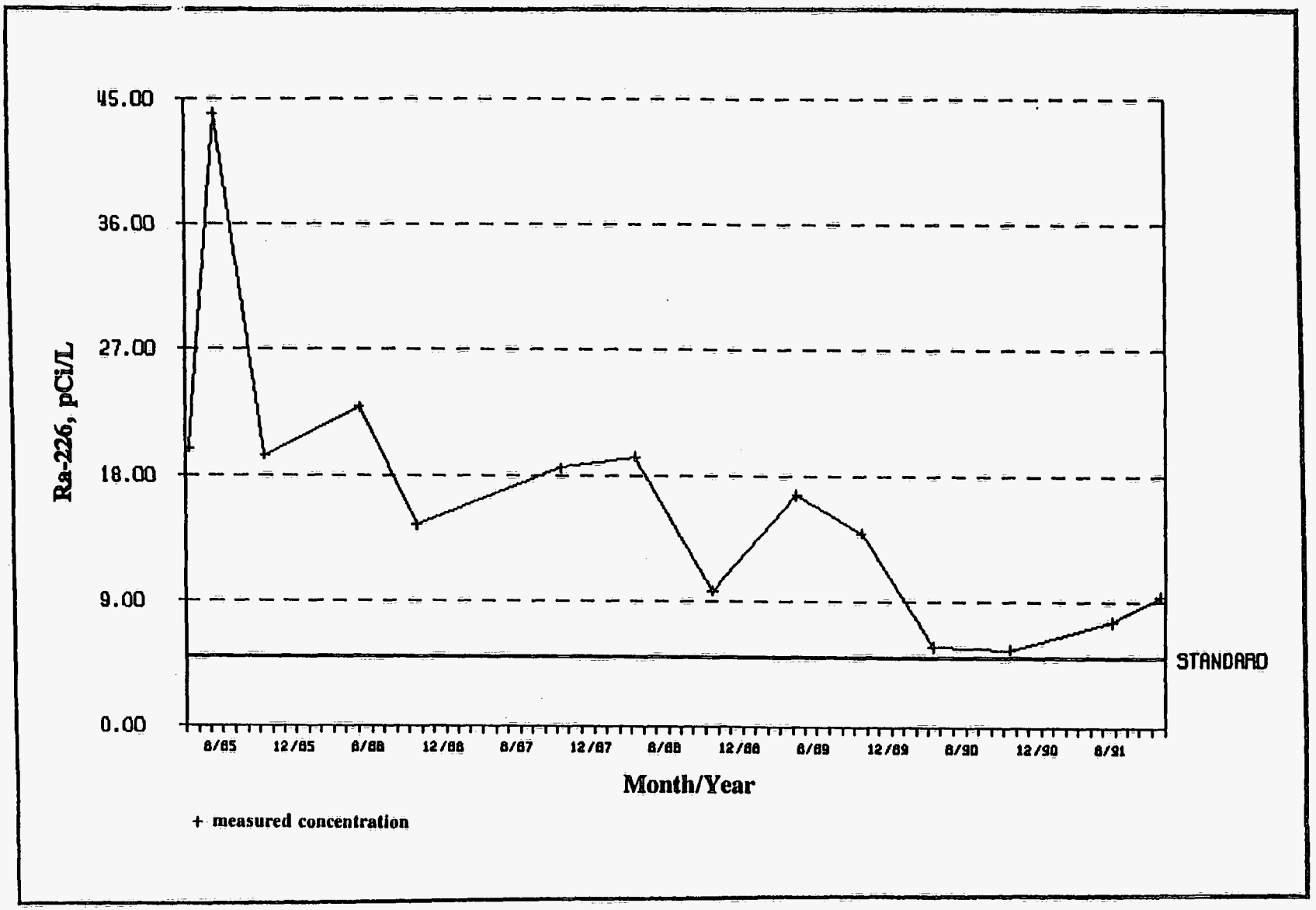

Figure 30. Radium Concentrations in Well 82-36A From April 1985 Through October 1991

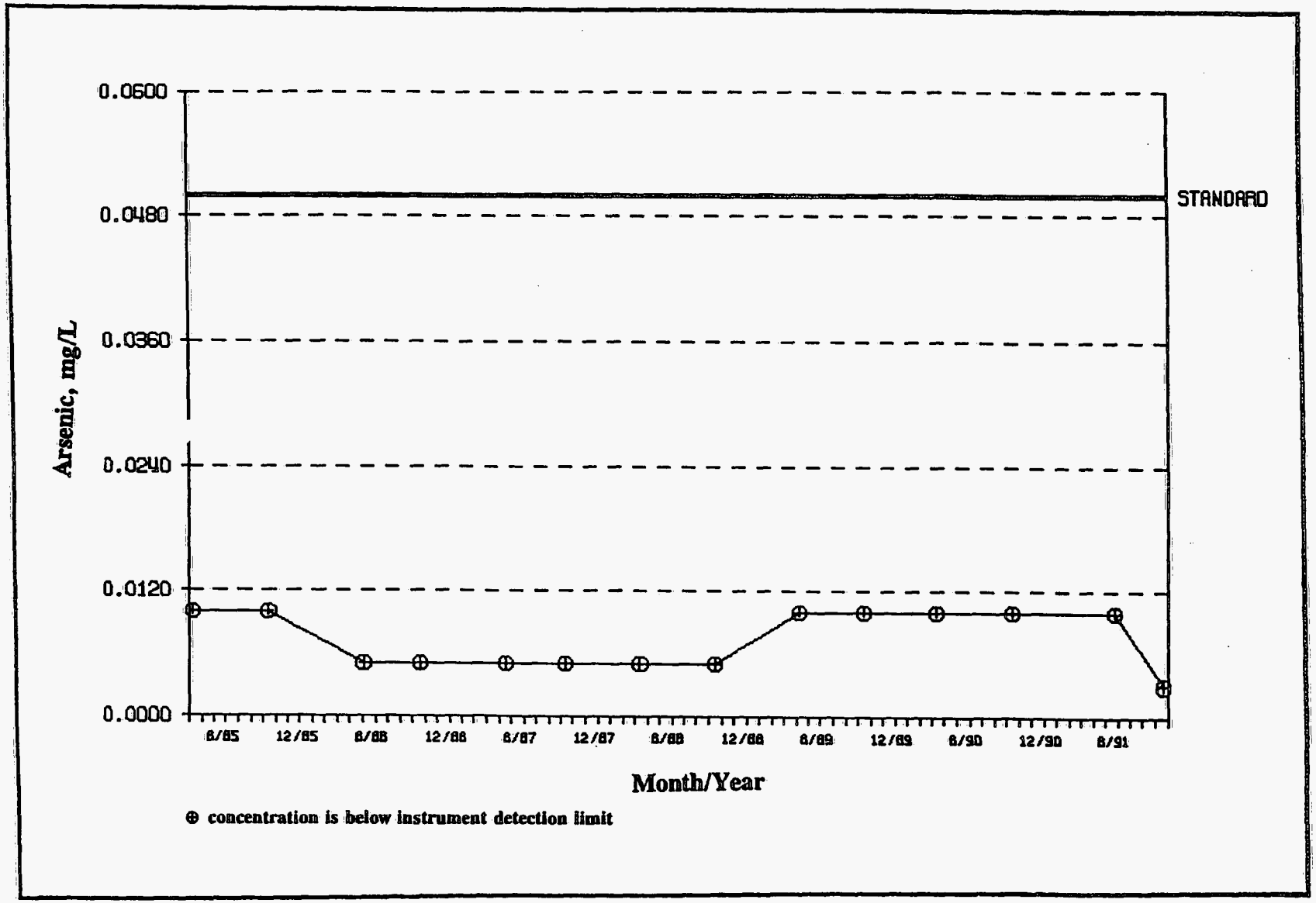

Figure 31. Arsenic Concentrations in Well 82-08 From April 1985 Through October 1991

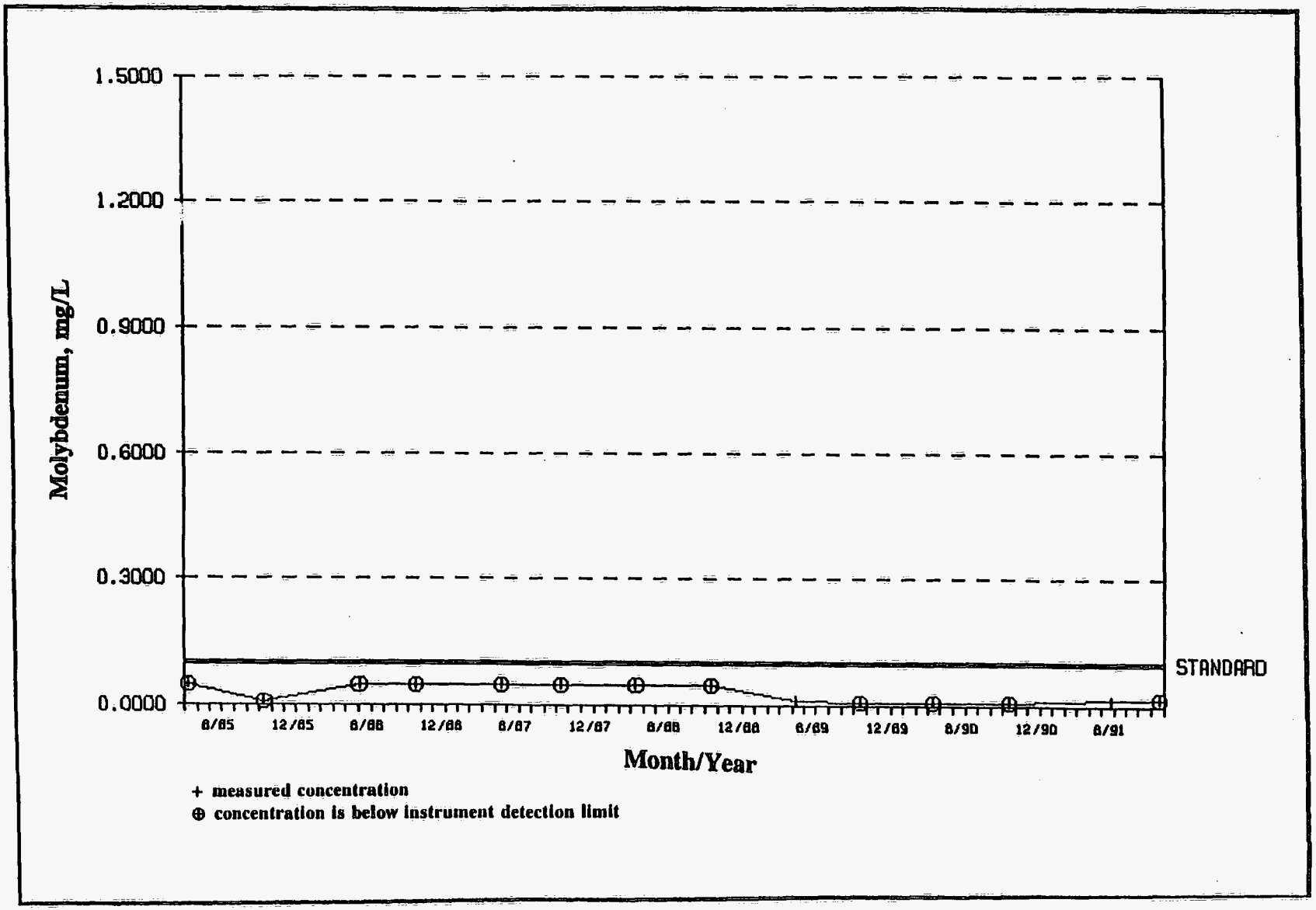

Figure 32. Molybdenum Concentrations in Well 82-08 From April 1985 Through October 1991

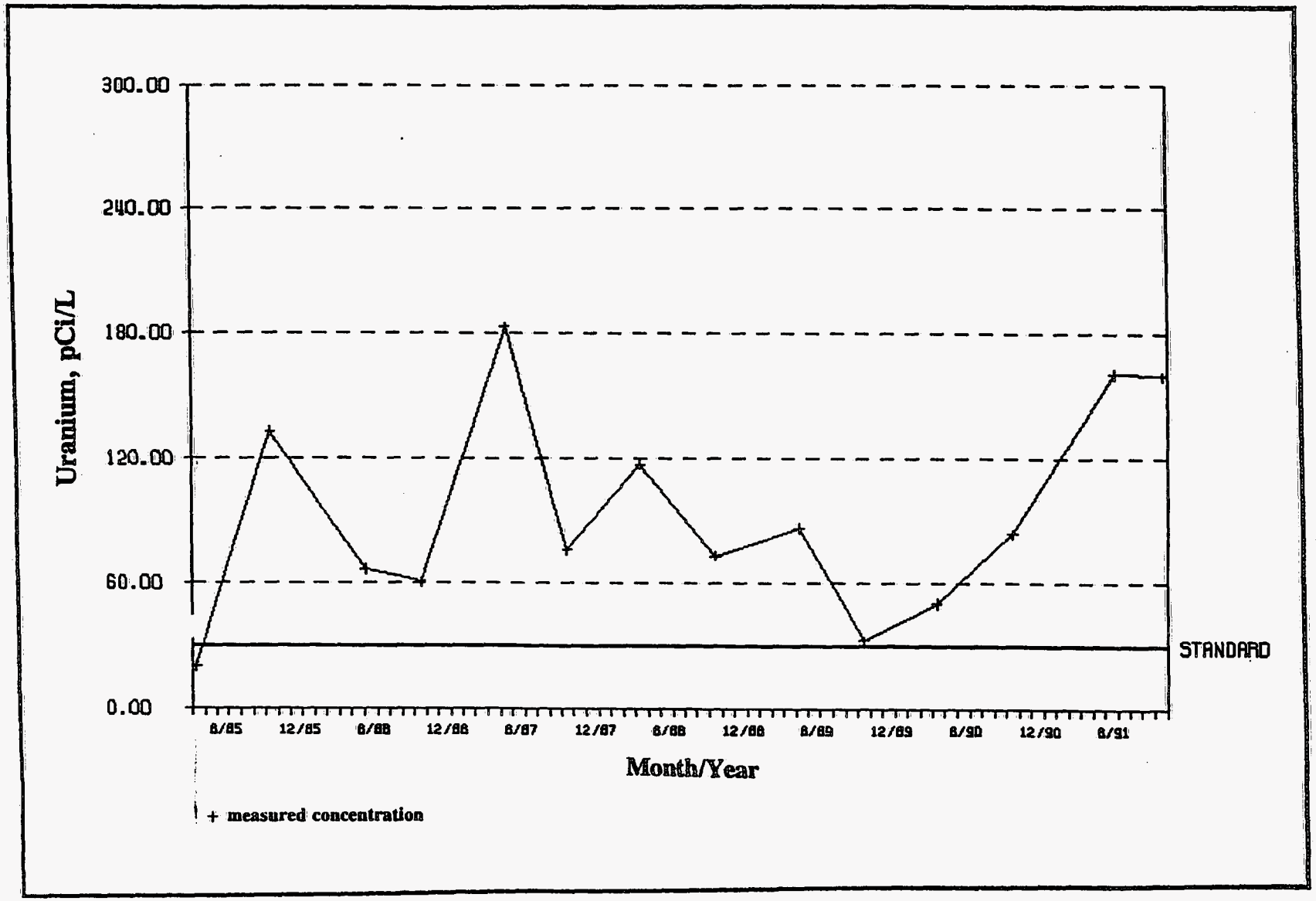

Figure 33. Uranium Concentrations in Well 82-08 From April 1985 Through October 1991

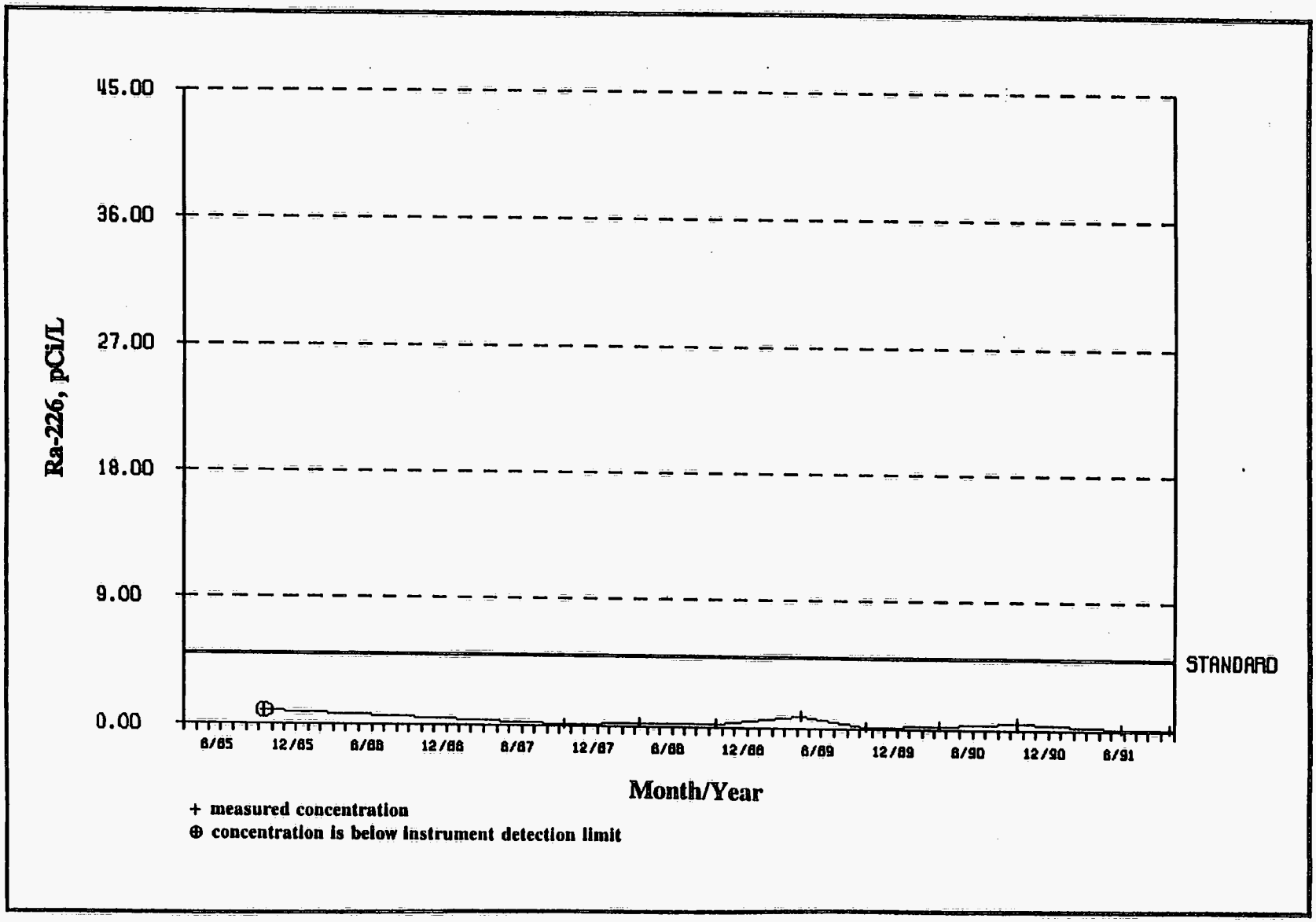

Figure 34. Radium Concentrations in Well 82-08 From April 1985 Through October 1991

QUALITY ASSURANCE

Geotech has a Quality Assurance Program (QAP) that complies with DOE Order 5700.6B, *Quality Assurance,* and responds to the requirements of ASME NQA-1 (1989), *Quality Assurance Program Requirements for Nuclear Facilities.* This program provides a structured approach for the application of quality assurance (QA) principles to work performed by Geotech and is implemented through the *Quality Assurance Manual* (Chem-Nuclear Geotech, Inc. 1991d).

A Quality Assurance Program Plan (QAPP) was developed for specific environmental monitoring and surveillance needs at the Monticello Millsite and is appended to the *Environmental Monitoring Plan* (Chem-Nuclear Geotech, Inc. 1991e). The primary foci of the QAPP are to ensure that all data and documentation are valid and traceable and meet requirements and to ensure that all environmental monitoring results are valid. In addition, the QAPP addresses organizational responsibility, design, procedures, records, and audits. Field and laboratory quality control (QC), human factors, chain-of-custody, performance reporting, and independent data verification are addressed by the organizations responsible for the work.

SAMPLING

Sampling methodologies used for environmental monitoring at the Monticello Millsite are described in the *Environmental Procedures Catalog* (Chem-Nuclear Geotech, Inc. 1991f) and follow EPA guidance given in *Test Methods for Evaluating Solid Waste* (US-EPA 1986). QA and QC measures are integrated into all sampling activities to ensure sample representativeness, sample accuracy, sample precision, data comparability, and data completeness.

LABORATORY ANALYSIS

The Analytical Chemistry Laboratory performs analyses in support of the environmental monitoring programs and implements QA requirements through the *Analytical Chemistry Laboratory Administrative Plan and Quality Control Procedures* (Chem-Nuclear Geotech, Inc. 1991g). The objective of the Analytical Chemistry Laboratory is to provide high-quality analytical data that adequately meet the environmental monitoring program requirements. This objective is met by implementing laboratory protocol that ensures that a sample will retain its proper identity, that analytical results will be obtained and reported correctly, and that a well-documented sample history will be maintained. QA and QC measures addressed include organizational responsibility, training/qualification of personnel, laboratory records, records control, laboratory QC, data acceptance, sample analysis, data recording and calculation, data deficiencies, chain-of-custody, procurement

of services, and quality assessment. Sampling and analytical methodologies are in the *Analytical Chemistry Laboratory Handbook of Analytical and Sample-Preparation Procedures* (Chem-Nuclear Geotech, Inc. 1991c).

The Analytical Chemistry Laboratory maintains an internal QC organization to provide independent data review and evaluation of QA data. The QA section staff includes in its audit program the evaluation of the effectiveness of the Analytical Chemistry Laboratory QC program.

Subcontracted analytical laboratories are under the supervision of the Analytical Chemistry Laboratory. It is the responsibility of the Analytical Chemistry Laboratory to monitor a subcontracted laboratory's methodologies and sample results and ensure that proper QC is practiced.

Interlaboratory Quality Assurance Programs

The Analytical Chemistry Laboratory participates in the DOE interlaboratory QA program coordinated by the DOE Environmental Measurements Laboratory (EML) for radioactive materials, as mandated by DOE Order 5400.1. This interlaboratory program is designed to test the quality of the environmental measurements being reported to the DOE by its contractors. Real or synthetic environmental samples that have been prepared and thoroughly analyzed at the program laboratory are distributed to the contractors for analysis, and the results are compiled for comparison. The Analytical Chemistry Laboratory also participates in two non-DOE interlaboratory QA programs: (1) EPA's Environmental Measurement Systems Laboratory (EMSL) for radioactive materials, and (2) the National Institute for Occupational Safety and Health Proficiency Analytical Testing Program for airborne metal, silica, and asbestos. A summary of the 1991 Analytical Chemistry Laboratory's results for the EML and EMSL interlaboratory QA programs is shown in Table 7. The precision of the laboratory's results can be determined by comparing the reported laboratory values with the reference values listed in Table 7.

DATA MANAGEMENT

Data management objectives for environmental monitoring activities are to maximize the usefulness and protection of important program information and to minimize the recordkeeping burden and cost. These objectives are achieved through establishment and implementation of continuous, systematic, and effective controls for each phase of a record's life cycle. Records must be identifiable, legible, and retrievable, and must be protected against deterioration, damage, or loss.

Table 7. Summary of Analytical Results for the Interlaboratory Quality Assurance Programs (EML and EMSL)

Analysis Date	Matrix Type	Isotope Analyzed	Reported Laboratory Value[a]	Reference Value[a]	Ratio Reported/ Reference
DOE Environmental Measurements Laboratory (EML)					
03/9	Air	Am-241	0.111	0.101	1.10
03/91	Air	Pu-239	0.150	0.154	0.97
03/91	Air	Sr-90	0.133	0.0789	1.69
03/91	Air	U	0.298	0.276	1.08
03/91	Soil	Am-241	0.175	0.176	0.99
03/91	Soil	Cs-137	0.185	0.150	1.23
03/91	Soil	Pu-238	0.113	0.115	0.98
03/91	Soil	Pu-239	0.351	0.340	1.03
03/91	Soil	Sr-90	0.11	0.920	1.20
03/91	Soil	U	0.198	0.234	0.85
03/91	Soil	U-234	0.329	0.294	1.12
03/91	Soil	U-238	0.324	0.300	1.08
03/91	Vegetn	Sr-90	0.170	0.186	0.91
03/91	Vegetn	Pu-238	0.360	0.406	0.89
03/91	Vegetn	Pu-239	0.102	0.140	0.73
03/91	Water	Am-241	0.118	0.119	0.99
03/91	Water	H-3	0.364	0.361	1.01
03/91	Water	Pu-239	0.709	0.773	0.92
03/91	Water	Sr-90	0.830	0.863	0.96
03/91	Water	U	0.170	0.172	0.99
09/91	Air	Am-241	0.102	0.104	0.98
09/91	Air	Be-7	0.514	0.538	0.96
09/91	Air	Ce-144	0.396	0.508	0.78
09/91	Air	Co-57	0.147	0.166	0.89
09/91	Air	Co-60	0.209	0.230	0.91
09/91	Air	Cs-137	0.266	0.280	0.95
09/91	Air	Mn-54	0.232	0.243	0.95
09/91	Air	Pu-239	0.800	0.840	0.95
09/91	Air	Sr-90	0.681	0.663	1.03
09/91	Air	U	0.390	0.308	1.27
09/91	Soil	Am-241	0.182	0.158	1.15
09/91	Soil	Cs-137	0.369	0.312	1.18
09/91	Soil	Pu-239	0.857	0.735	1.17
09/91	Soil	U-234	0.327	0.289	1.13
09/91	Soil	U-238	0.322	0.289	1.11
09/91	Soil	U	0.210	0.228	0.92
09/91	Vegetn	Sr-90	0.356	0.439	0.81
09/91	Vegetn	Pu-239	0.405	0.365	1.11
09/91	Vegetn	Am-241	0.258	0.266	0.97
09/91	Vegetn	K-40	0.797	0.992	0.80
09/91	Vegetn	Cs-137	0.310	0.271	1.14
09/91	Water	Am-241	0.575	0.570	1.01
09/91	Water	Ce-144	0.229	0.226	1.01
09/91	Water	Co-57	0.177	0.166	1.07
09/91	Water	Co-60	0.295	0.291	1.01
09/91	Water	Cs-137	0.511	0.460	1.11
09/91	Water	H-3	0.110	0.100	1.10
09/91	Water	Mn-54	0.106	0.103	1.03
09/91	Water	Pu-239	0.482	0.510	0.95
09/91	Water	Sr-90	0.103	0.101	1.02
09/91	Water	U	0.416	0.370	1.12
09/91	Water	U-234	0.530	0.462	1.15
09/91	Water	U-238	0.530	0.478	1.11
Environmental Monitoring Systems Laboratory (EMSL)					
01/11/91	Water	Sr-90	5.00	5.00	1.00
02/08/91	Water	Co-60	41.00	40.00	1.03
02/08/91	Water	Zn-65	156.67	149.00	1.05
02/08/91	Water	Ru-106	196.67	186.00	1.06
02/08/91	Water	Cs-134	7.00	8.00	0.88
02/08/91	Water	Cs-137	8.00	8.00	1.00
02/08/91	Water	Ba-133	65.33	75.00	0.87
03/08/91	Water	Ra-226	30.37	31.80	0.96
03/08/91	Water	Ra-228	20.47	21.10	0.97
03/29/91	Air	Alpha	24.67	25.00	0.99
03/29/91	Air	Beta	111.00	124.00	0.90
03/29/91	Air	Sr-90	38.33	40.00	0.96
05/10/91	Water	Sr-90	23.33	24.00	0.97
05/17/91	Water	Gross Alpha	19.33	24.00	0.81
05/17/91	Water	Gross Beta	37.33	46.00	0.81
08/23/91	Water	Pu-239	20.43	19.40	1.05
08/30/91	Air	Alpha	24.00	25.00	0.96
08/30/91	Air	Beta	95.00	92.00	1.03
08/30/91	Air	Cs-137	30.00	30.00	1.00
08/30/91	Air	Sr-90	28.00	30.00	0.93
10/04/91	Water	Ba-133	104.33	98.00	1.06
10/04/91	Water	Co-60	30.67	29.00	1.06
10/04/91	Water	Cs-134	13.00	10.00	1.30
10/04/91	Water	Cs-137	13.33	10.00	1.33
10/04/91	Water	Ru-106	217.00	199.00	1.09
10/04/91	Water	Zn-65	75.00	73.00	1.03
10/08/91	Water	H-3	2423.67	2454.00	0.99
11/08/91	Water	Ra-226	6.50	6.50	1.00
11/08/91	Water	Ra-228	7.93	8.10	0.98

[a]All values are relative. Exponents are not included; therefore, values do not indicate actual concentrations.

Data management for environmental monitoring activities includes receipt of laboratory results via network transfer, data entry of information, and formatting of data for report preparation. All environmental monitoring data are stored in an ORACLE database on a MicroVAX computer system that is maintained by Geotech. Records generated in support of environmental monitoring activities are subject to the requirements for maximum-level records as specified in the QAPP for the *Environmental Monitoring Plan* (Chem-Nuclear Geotech, Inc. 1991e) and in Section 13 of Geotech's *Management Policies Manual* (Chem-Nuclear Geotech, Inc. 1991h).

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APPENDIX A

MONITORING DATA

Please note

Tables A-14 and A-15 may contain different units for the same constituent. For example, sodium (Na) concentrations are expressed as mg/L in Table A-14, whereas they are expressed as μg/L in Table A-15. The units listed are those reported by the laboratory that performed the analysis. Please exercise care when comparing these data.

Table A-1. Radon Data for Monticello, First Quarter 1991
(Start Date 11/15/90--End Date 2/26/91)

Sample Location	Detector Number	Reported Radon[a] (pCi/L)	Corrected Radon[b] (pCi/L)	Radon Concen. (μCi/mL)
RN-M-04	3165578	1.677	1.434	1.434E-09
RN-M-04	3165585	1.677	1.434	1.434E-09
RN-M-06	3165580	1.384	1.179	1.180E-09
RN-M-06	3165582	1.426	1.216	1.216E-09
RN-M-07	3165571	3.187	2.740	2.741E-09
RN-M-07	3165584	3.187	2.740	2.741E-09
RN-M-10	3165575	.3356	.2723	2.723E-10
RN-M-10	3165581	.3775	.3086	3.086E-10
RN-M-11	3165573	.2936	.236	2.360E-10
RN-M-11	3165579	.5453	.4538	4.538E-10
RN-M-13	3165568	.2517	.1996	1.996E-10
RN-M-13	3165587	.2936	.236	2.360E-10
RN-M-14	3165588	.2097	.1633	1.633E-10
RN-M-14	3165590	.2097	.1633	1.633E-10
RN-M-15	3165569	.4194	.3449	3.449E-10
RN-M-15	3165576	.5033	.4175	4.175E-10

[a]The reported radon values are the results received from the subcontracted laboratory.

[b]The corrected radon values are derived by applying a correction factor to the reported values. The correction factor is the ratio of a known exposure value to the value that is measured and reported.

Table A-2. Radon Data for Monticello, Second Quarter 1991
(Start Date 2/27/91--End Date 6/13/91)

Sample Location	Detector Number	Reported Radon[a] (pCi/L)	Corrected Radon[b] (pCi/L)	Radon Concen. (μCi/mL)
RN-M-04	3176716	1.221	1.714	1.714E-09
RN-M-04	3176733	1.098	1.542	1.543E-09
RN-M-06	3176713	.4884	.6857	6.857E-10
RN-M-06	3176734	1.017	1.428	1.429E-09
RN-M-07	3176705	1.831	2.571	2.572E-09
RN-M-07	3176731	1.912	2.685	2.686E-09
RN-M-10	3176715	.2849	.4	4.000E-10
RN-M-10	3176728	.1221	.1714	1.714E-10
RN-M-11	3176703	.0407	.0571	5.710E-11
RN-M-11	3176723	.2849	.4	4.000E-10
RN-M-13	3176712	.3663	.5143	5.143E-10
RN-M-13	3176735	.4477	.6286	6.286E-10
RN-M-14	3176719	.0407	.0571	5.710E-11
RN-M-14	3176721	.0407	.0571	5.710E-11
RN-M-15	3176729	.4477	.6286	6.286E-10
RN-M-15	3176736	.407	.5715	5.715E-10

[a]The reported radon values are the results received from the subcontracted laboratory.

[b]The corrected radon values are derived by applying a correction factor to the reported values. The correction factor is the ratio of a known exposure value to the value that is measured and reported.

Table A-3. Radon Data for Monticello, Third Quarter 1991
(Start Date 6/13/91--End Date 9/25/91)

Sample Location	Detector Number	Reported Radon[a] (pCi/L)	Corrected Radon[b] (pCi/L)	Radon Concen. (μCi/mL)
RN-M-04	3212339	1.453	1.634	1.634E-09
RN-M-04	3212340	1.577	1.774	1.774E-09
RN-M-06	3212345	1.121	1.260	1.261E-09
RN-M-06	3212352	2.117	2.381	2.381E-09
RN-M-07	3212337	3.362	3.781	3.782E-09
RN-M-07	3212342	3.155	3.548	3.548E-09
RN-M-10	3212335	.3737	.4202	4.202E-10
RN-M-10	3212347	.0415	.0467	4.670E-11
RN-M-11	3212334	.0415	.0467	4.670E-11
RN-M-11	3212346	.083	.0934	9.340E-11
RN-M-13	3212328	.0415	.0467	4.670E-11
RN-M-13	3212343	.0415	.0467	4.670E-11
RN-M-14	3212341	.0415	.0467	4.670E-11
RN-M-14	3212349	.0415	.0467	4.670E-11
RN-M-15	3212336	.2491	.2801	2.801E-10
RN-M-15	3212351	.6228	.7003	7.003E-10

[a]The reported radon values are the results received from the subcontracted laboratory.

[b]The corrected radon values are derived by applying a correction factor to the reported values. The correction factor is the ratio of a known exposure value to the value that is measured and reported.

Table A-4. Radon Data for Monticello, Fourth Quarter 1991
(Start Date 9/25/91--End Date 12/30/91)

Sample Location	Detector Number	Reported Radon[a] (pCi/L)	Corrected Radon[b] (pCi/L)	Radon Concen. (μCi/mL)
RN-M-04	3212403	.7609	1.150	1.151E-09
RN-M-04	3212522	.6087	.9207	9.207E-10
RN-M-06	3212398	.6087	.9207	9.207E-10
RN-M-06	3212521	.6848	1.035	1.036E-09
RN-M-07	3212402	2.130	3.222	3.222E-09
RN-M-07	3212524	1.673	2.531	2.532E-09
RN-M-10	3212395	.1902	.2877	2.877E-10
RN-M-10	3212529	.038	.0575	5.750E-11
RN-M-11	3212406	.038	.0575	5.750E-11
RN-M-11	3212526	.038	.0575	5.750E-11
RN-M-13	3212401	.038	.0575	5.750E-11
RN-M-13	3212405	.038	.0575	5.750E-11
RN-M-14	3212525	.038	.0575	5.750E-11
RN-M-14	3212527	.038	.0575	5.750E-11
RN-M-15	3212399	.3424	.5179	5.179E-10
RN-M-15	3212523	.038	.0575	5.750E-11

[a]The reported radon values are the results received from the subcontracted laboratory.

[b]The corrected radon values are derived by applying a correction factor to the reported values. The correction factor is the ratio of a known exposure value to the value that is measured and reported.

Table A-5. Analytical Air Sample Results for Station AIR-M-4 during 1991

Sample Location	Sample Date	Ticket Number	Flow Rate (SCFM)	Sample Time (Hours)	Lead		Radium		Thorium-230			Uranium		
					(µg/F)	(µg/m³)	(pCi/F)	(µCi/mL)	(pCi/F)	(µCi/mL)	(pg/mL)	(µg/F)	(µg/m³)	(µCi/mL)
AIR-M-4	04-01-1991	MHN-976	33	23.16	36.0	0.02772	0.7	5.390E-16	0.6	4.620E-16	2.382E-08	1.0	0.0008	5.128E-16
AIR-M-4	04-07-1991	MDV-842	33	23.79	35.0	0.02624	-1.4	-1.050E-15	0.5	3.749E-16	1.932E-08	2.0	0.0015	9.986E-16
AIR-M-4	04-13-1991	MDV-845	33	23.78	32.0	0.02400	-1.3	-9.749E-16	0.4	3.000E-16	1.546E-08	1.0	0.0007	4.994E-16
AIR-M-4	04-19-1991	MDV-848	33	23.80	34.0	0.02547	-1.3	-9.740E-16	0.4	2.997E-16	1.545E-08	1.0	0.0007	4.990E-16
AIR-M-4	05-07-1991	MHN-985	32	23.80	53.0	0.04096	1.2	9.273E-16	0.6	4.637E-16	2.390E-08	2.0	0.0015	1.029E-15
AIR-M-4	05-13-1991	MHN-988	32	23.80	50.0	0.03863	1.0	7.727E-16	0.7	5.409E-16	2.788E-08	2.0	0.0015	1.029E-15
AIR-M-4	06-12-1991	MNK-951	32	23.88	49.0	0.03773	1.2	9.240E-16	0.5	3.850E-16	1.984E-08	2.0	0.0015	1.026E-15
AIR-M-4	06-18-1991	MNK-954	32	23.88	49.0	0.03773	1.7	1.309E-15	0.4	3.080E-16	1.588E-08	2.0	0.0015	1.026E-15
AIR-M-4	06-24-1991	MNK-957	32	25.57	67.6	0.04861	1.1	7.911E-16	0.4	2.877E-16	1.483E-08	1.6	0.0012	7.663E-16
AIR-M-4	06-30-1991	MNK-960	32	25.39	67.6	0.04897	1.0	7.244E-16	0.5	3.622E-16	1.867E-08	1.7	0.0012	8.202E-16
AIR-M-4	07-06-1991	MNK-963	32	23.88	66.6	0.05129	0.8	6.161E-16	0.5	3.850E-16	1.985E-08	1.5	0.0012	7.693E-16
AIR-M-4	07-12-1991	MNK-966	32	23.91	66.5	0.05115	1.2	9.230E-16	0.5	3.846E-16	1.982E-08	1.5	0.0012	7.684E-16
AIR-M-4	07-18-1991	MNK-969	32	23.88	68.7	0.05290	0.8	6.160E-16	0.5	3.850E-16	1.985E-08	1.6	0.0012	8.206E-16
AIR-M-4	07-24-1991	MNK-972	32	23.89	69.3	0.05335	1.3	1.001E-15	0.5	3.849E-16	1.984E-08	1.5	0.0012	7.691E-16
AIR-M-4	07-30-1991	MNK-975	32	26.92	69.8	0.04768	0.8	5.465E-16	0.6	4.099E-16	2.113E-08	1.4	0.0010	6.369E-16
AIR-M-4	08-05-1991	MLY-430	32	23.89	69.4	0.05343	1.3	1.001E-15	0.4	3.079E-16	1.587E-08	1.5	0.0012	7.691E-16
AIR-M-4	08-11-1991	MLY-433	32	23.89	80.4	0.06189	0.9	6.927E-16	0.4	3.079E-16	1.587E-08	1.7	0.0013	8.715E-16
AIR-M-4	08-17-1991	MLY-436	32	23.89	69.9	0.05380	1.0	7.697E-16	0.5	3.848E-16	1.984E-08	1.5	0.0012	7.689E-16
AIR-M-4	08-23-1991	MLY-439	32	23.90	60.5	0.04655	0.8	6.155E-16	0.6	4.616E-16	2.380E-08	1.4	0.0011	7.174E-16
AIR-M-4	08-29-1991	MLY-442	32	23.90	70.3	0.05410	0.9	6.926E-16	0.4	3.078E-16	1.587E-08	1.5	0.0012	7.688E-16
AIR-M-4	09-04-1991	MLY-445	32	23.90	68.8	0.05293	0.8	6.155E-16	0.5	3.847E-16	1.983E-08	1.6	0.0012	8.199E-16
AIR-M-4	09-10-1991	MLY-448	32	23.89	71.7	0.05518	0.9	6.927E-16	0.4	3.079E-16	1.587E-08	1.5	0.0012	7.689E-16
AIR-M-4	09-16-1991	MHN-951	32	23.89	52.2	0.04018	-0.9	-6.927E-16	-0.6	-4.618E-16	-2.380E-08	2.0	0.0015	1.025E-15
AIR-M-4	09-22-1991	MHN-954	32	23.90	53.0	0.04079	-1.3	-1.000E-15	-0.6	-4.618E-16	-2.380E-08	2.1	0.0016	1.076E-15
AIR-M-4	09-28-1991	MHN-957	32	23.90	54.3	0.04178	-1.7	-1.308E-15	0.8	6.156E-16	3.173E-08	2.0	0.0015	1.025E-15
AIR-M-4	10-04-1991	MHN-961	33	23.90	52.5	0.03917	-1.7	-1.269E-15	1.0	7.462E-16	3.846E-08	2.1	0.0016	1.044E-15
AIR-M-4	10-10-1991	MHN-964	33	47.80	49.5	0.01847	2.7	1.007E-15	1.0	3.731E-16	1.923E-08	2.2	0.0008	5.466E-16
AIR-M-4	10-22-1991	MHN-967	33	23.90	55.5	0.04142	1.0	7.462E-16	0.7	5.224E-16	2.693E-08	2.0	0.0015	9.940E-16
AIR-M-4	10-28-1991	MHN-970	33	23.90	52.7	0.03933	1.5	1.119E-15	0.6	4.477E-16	2.308E-08	2.0	0.0015	9.940E-16

Table A-6. Analytical Air Sample Results for Station AIR-M-5 during 1991

Sample Location	Sample Date	Ticket Number	Flow Rate (SCFM)	Sample Time (Hours)	Lead		Radium		Thorium-230			Uranium		
					(µCi/F)	(µg/m³)	(pCi/F)	(µCi/mL)	(pCi/F)	(µCi/mL)	(pg/mL)	(µg/F)	(µg/m³)	(µCi/mL)
AIR-M-5	04-01-1991	MHN-977	33	24.27	38.00	0.02793	<0.7	<5.144E-16	0.6	4.409E-16	2.273E-08	1.0	0.0007	4.894E-16
AIR-M-5	04-07-1991	MDV-843	33	24.27	33.00	0.02425	<1.4	<1.029E-15	<0.4	<2.940E-16	<1.515E-08	1.0	0.0007	4.894E-16
AIR-M-5	04-13-1991	MDV-846	33	24.27	31.00	0.02278	<1.4	<1.029E-15	<0.3	<2.204E-16	<1.136E-08	1.0	0.0007	4.893E-16
AIR-M-5	04-19-1991	MDV-849	33	24.27	35.00	0.02572	<1.5	<1.102E-15	<0.5	<3.674E-16	<1.894E-08	1.0	0.0007	4.894E-16
AIR-M-5	05-01-1991	MHN-983	32	24.27	52.00	0.03940	<0.6	<4.547E-16	0.8	6.062E-16	3.125E-08	2.0	0.0015	1.009E-15
AIR-M-5	05-07-1991	MHN-986	32	24.27	54.00	0.04092	1.0	7.578E-16	0.5	3.789E-16	1.953E-08	2.0	0.0015	1.009E-15
AIR-M-5	05-13-1991	MHN-989	32	24.28	51.00	0.03864	<1.1	<8.333E-16	0.6	4.545E-16	2.343E-08	2.0	0.0015	1.009E-15
AIR-M-5	06-12-1991	MNK-952	32	24.28	48.00	0.03636	<1.7	<1.288E-15	0.5	3.788E-16	1.952E-08	2.0	0.0015	1.009E-15
AIR-M-5	06-18-1991	MNK-955	32	24.25	50.00	0.03792	<1.3	<9.860E-16	0.7	5.309E-16	2.737E-08	2.0	0.0015	1.010E-15
AIR-M-5	06-24-1991	MNK-958	32	24.26	69.90	0.05299	0.9	6.823E-16	0.4	3.033E-16	1.563E-08	1.7	0.0013	8.584E-16
AIR-M-5	06-30-1991	MNK-961	32	24.25	70.40	0.05339	0.7	5.308E-16	0.4	3.033E-16	1.564E-08	1.6	0.0012	8.081E-16
AIR-M-5	07-06-1991	MNK-964	32	24.26	67.70	0.05133	0.8	6.065E-16	0.3	2.275E-16	1.172E-08	1.6	0.0012	8.079E-16
AIR-M-5	07-12-1991	MNK-967	32	24.24	71.80	0.05446	0.7	5.310E-16	0.5	3.793E-16	1.955E-08	1.6	0.0012	8.083E-16
AIR-M-5	07-18-1991	MNK-970	32	24.25	70.30	0.05331	0.9	6.825E-16	0.4	3.033E-16	1.564E-08	1.5	0.0011	7.576E-16
AIR-M-5	07-24-1991	MNK-973	32	24.25	69.30	0.05255	1.1	8.342E-16	0.5	3.792E-16	1.954E-08	1.5	0.0011	7.576E-16
AIR-M-5	07-30-1991	MLY-428	32	24.24	68.80	0.05219	1.2	9.103E-16	0.4	3.034E-16	1.564E-08	1.4	0.0011	7.073E-16
AIR-M-5	08-05-1991	MLY-431	32	24.26	71.20	0.05397	0.7	5.306E-16	0.3	2.274E-16	1.172E-08	1.5	0.0011	7.572E-16
AIR-M-5	08-11-1991	MLY-434	32	24.25	67.40	0.05111	0.7	5.308E-16	0.5	3.791E-16	1.954E-08	1.5	0.0011	7.575E-16
AIR-M-5	08-17-1991	MLY-437	32	24.24	71.80	0.05447	1.0	7.586E-16	0.4	3.034E-16	1.564E-08	1.5	0.0011	7.578E-16
AIR-M-5	08-23-1991	MLY-440	32	24.25	61.90	0.04694	0.9	6.825E-16	0.4	3.033E-16	1.564E-08	1.4	0.0011	7.071E-16
AIR-M-5	08-29-1991	MLY-443	32	24.25	73.20	0.05552	1.0	7.585E-16	0.3	2.275E-16	1.173E-08	1.5	0.0011	7.577E-16
AIR-M-5	09-04-1991	MLY-446	32	24.25	67.40	0.05111	0.9	6.824E-16	0.5	3.791E-16	1.954E-08	1.7	0.0013	8.585E-16
AIR-M-5	09-10-1991	MLY-449	32	24.26	71.10	0.05390	1.0	7.581E-16	0.3	2.274E-16	1.172E-08	1.4	0.0011	7.069E-16
AIR-M-5	09-16-1991	MHH-952	32	24.26	51.80	0.03927	<1.3	<9.855E-16	<0.7	<5.307E-16	<2.735E-08	1.9	0.0014	9.593E-16
AIR-M-5	09-22-1991	MHH-955	32	27.58	53.50	0.03567	<1.1	<7.335E-16	0.7	4.668E-16	2.406E-08	2.0	0.0013	8.882E-16
AIR-M-5	09-28-1991	MHH-958	32	24.26	54.70	0.04146	2.6	1.971E-15	0.8	6.064E-16	3.126E-08	2.0	0.0015	1.010E-15
AIR-M-5	10-04-1991	MHH-962	33	24.26	52.90	0.03889	<1.0	<7.352E-16	0.7	5.146E-16	2.653E-08	2.1	0.0015	1.028E-15
AIR-M-5	10-10-1991	MHH-965	33	48.52	59.90	0.02201	3.0	1.103E-15	1.1	4.043E-16	2.084E-08	2.2	0.0008	5.385E-16
AIR-M-5	10-22-1991	MHH-968	33	24.26	58.00	0.04263	<1.1	<8.086E-16	0.6	4.410E-16	2.273E-08	2.1	0.0015	1.028E-15
AIR-M-5	10-28-1991	MHH-971	33	24.26	52.30	0.03844	0.8	5.880E-16	0.8	5.880E-16	3.031E-08	2.0	0.0015	9.791E-16

Table A-7. Analytical Air Sample Results for Station AIR-M-6 during 1991

Sample Location	Sample Date	Ticket Number	Flow Rate (SCFM)	Sample Time (Hours)	Lead		Radium		Thorium-230			Uranium		
					(µg/F)	(µg/m³)	(pCi/F)	(µCi/mL)	(pCi/F)	(µCi/mL)	(pg/mL)	(µg/F)	(µg/m³)	(µCi/mL)
AIR-M-6	04-01-1991	MHN-978	33	23.99	39.0	0.02900	<0.7	<5.204E-16	0.5	3.717E-16	1.916E-08	1.0	0.0007	4.952E-16
AIR-M-6	04-07-1991	MDV-844	33	24.00	31.0	0.02303	<0.9	<6.686E-16	<0.3	<2.229E-16	<1.149E-08	1.0	0.0007	4.948E-16
AIR-M-6	04-13-1991	MDV-847	33	24.00	31.0	0.02303	<1.2	<8.916E-16	<0.2	<1.486E-16	<7.659E-09	1.0	0.0007	4.948E-16
AIR-M-6	04-19-1991	MDV-850	33	23.98	31.0	0.02305	<1.9	<1.413E-15	0.4	2.975E-16	1.533E-08	1.0	0.0007	4.953E-16
AIR-M-6	05-01-1991	MHN-982	32	23.98	34.0	0.02607	<0.5	<3.834E-16	0.3	2.300E-16	1.186E-08	2.0	0.0015	1.021E-15
AIR-M-6	05-07-1991	MHN-987	32	23.97	50.0	0.03837	<1.0	<7.674E-16	0.4	3.069E-16	1.582E-08	2.0	0.0015	1.022E-15
AIR-M-6	05-13-1991	MHN-990	32	23.97	50.0	0.03836	0.7	5.371E-16	0.5	3.836E-16	1.977E-08	2.0	0.0015	1.022E-15
AIR-M-6	06-12-1991	MNK-953	32	23.99	49.0	0.03756	1.1	8.432E-16	0.3	2.300E-16	1.185E-08	2.0	0.0015	1.021E-15
AIR-M-6	06-18-1991	MNK-956	32	24.00	50.0	0.03832	<1.0	<7.664E-16	0.6	4.598E-16	2.370E-08	2.0	0.0015	1.021E-15
AIR-M-6	06-24-1991	MNK-959	32	24.00	68.3	0.05233	0.8	6.129E-16	0.3	2.299E-16	1.185E-08	1.5	0.0011	7.654E-16
AIR-M-6	06-30-1991	MNK-962	32	24.01	67.1	0.05139	0.8	6.127E-16	0.4	3.064E-16	1.579E-08	1.5	0.0011	7.652E-16
AIR-M-6	07-06-1991	MNK-965	32	23.99	68.5	0.05250	1.0	7.665E-16	0.3	2.299E-16	1.185E-08	1.6	0.0012	8.167E-16
AIR-M-6	07-12-1991	MNK-968	32	24.00	68.2	0.05226	0.9	6.897E-16	0.3	2.299E-16	1.185E-08	1.5	0.0012	7.656E-16
AIR-M-6	07-18-1991	MNK-971	32	24.00	69.3	0.05311	0.7	5.364E-16	0.4	3.065E-16	1.580E-08	1.5	0.0012	7.656E-16
AIR-M-6	07-24-1991	MNK-974	32	23.99	70.2	0.05381	0.7	5.366E-16	0.4	3.066E-16	1.580E-08	1.5	0.0012	7.657E-16
AIR-M-6	07-30-1991	MLY-429	32	23.98	67.1	0.05145	0.9	6.901E-16	0.4	3.067E-16	1.581E-08	1.4	0.0011	7.150E-16
AIR-M-6	08-05-1991	MLY-432	32	23.98	71.0	0.05444	0.8	6.135E-16	0.3	2.300E-16	1.186E-08	1.3	0.0010	6.639E-16
AIR-M-6	08-11-1991	MLY-435	32	23.98	74.2	0.05691	1.0	7.670E-16	0.4	3.068E-16	1.581E-08	1.7	0.0013	8.684E-16
AIR-M-6	08-17-1991	MLY-438	32	23.99	68.1	0.05220	1.0	7.665E-16	0.4	3.066E-16	1.580E-08	1.5	0.0012	7.657E-16
AIR-M-6	08-23-1991	MLY-441	32	24.00	71.8	0.05501	1.1	8.427E-16	0.4	3.065E-16	1.580E-08	1.6	0.0012	8.164E-16
AIR-M-6	08-29-1991	MLY-444	32	23.98	69.5	0.05330	0.9	6.902E-16	0.3	2.301E-16	1.186E-08	1.4	0.0011	7.150E-16
AIR-M-6	09-04-1991	MLY-447	32	23.98	68.0	0.05214	1.0	7.668E-16	0.4	3.067E-16	1.581E-08	1.4	0.0011	7.150E-16
AIR-M-6	09-10-1991	MLY-450	32	23.98	67.1	0.05146	1.0	7.670E-16	0.4	3.068E-16	1.581E-08	1.4	0.0011	7.151E-16
AIR-M-6	09-16-1991	MHH-953	32	23.98	53.0	0.04064	<1.3	<9.969E-16	0.7	5.368E-16	2.767E-08	2.0	0.0015	1.021E-15
AIR-M-6	09-22-1991	MHH-956	32	23.97	54.5	0.04181	<1.3	<9.973E-16	1.2	9.206E-16	4.745E-08	2.0	0.0015	1.022E-15
AIR-M-6	09-28-1991	MHH-959	32	23.98	52.4	0.04019	<1.7	<1.304E-15	0.7	5.369E-16	2.767E-08	2.0	0.0015	1.022E-15
AIR-M-6	10-04-1991	MHH-963	33	23.97	53.8	0.04002	2.6	1.934E-15	0.7	5.207E-16	2.684E-08	1.9	0.0014	9.413E-16
AIR-M-6	10-10-1991	MHH-966	33	47.96	62.5	0.02324	<2.0	<7.437E-16	0.7	2.603E-16	1.342E-08	2.0	0.0007	4.953E-16
AIR-M-6	10-22-1991	MHH-969	33	23.99	53.6	0.03985	<1.1	<8.178E-16	0.8	5.947E-16	3.066E-08	2.1	0.0016	1.040E-15
AIR-M-6	10-28-1991	MHH-972	33	23.99	52.4	0.03896	<0.8	<5.947E-16	<0.6	<4.461E-16	<2.299E-08	2.0	0.0015	9.903E-16

Table A-8. Suspended Particulates (PM_{10}) Data for Station AIR-M-4 during 1991

Sample Location	Sample Date	Ticket Number	Filter Number	Flow Rate (SCFM)	Sample Time (Hours)	Weight (g/F)	Concentration ($\mu g/m^3$)
AIR-M-4	04-01-1991	MHN-976	5771224	33	23.16	0.014	11.088
AIR-M-4	04-07-1991	MDV-842	5771221	33	23.79	0.026	19.418
AIR-M-4	04-13-1991	MDV-845	5771218	33	23.78	0.002	1.650
AIR-M-4	04-19-1991	MDV-848	5771215	33	23.80	0.012	9.216
AIR-M-4	04-25-1991	MNH-979	5771212	33	23.79	0.038	28.113
AIR-M-4	05-01-1991	MNH-982	5771209	32	23.82	0.037	28.179
AIR-M-4	06-06-1991	MNH-997	5903058	32	47.70	0.057	21.861
AIR-M-4	05-13-1991	MHN-988	5767686	32	23.80	0.024	18.235
AIR-M-4	05-07-1991	MHN-985	5767689	32	23.80	0.016	12.287
AIR-M-4	05-25-1991	MNH-994	5767683	32	23.82	0.017	13.127
AIR-M-4	06-12-1991	MNK-951	5903055	32	23.88	0.019	14.630
AIR-M-4	06-18-1991	MNK-954	5903052	32	23.88	0.010	7.777
AIR-M-4	06-24-1991	MNK-957	5903049	32	25.57	0.037	26.752
AIR-M-4	06-30-1991	MNK-960	5903046	32	25.39	0.017	12.459
AIR-M-4	07-06-1991	MNK-963	5903174	32	23.88	0.011	8.317
AIR-M-4	07-12-1991	MNK-966	5903171	32	23.91	0.018	13.922
AIR-M-4	07-18-1991	MNK-969	5903168	32	23.88	0.015	11.397
AIR-M-4	07-24-1991	MNK-972	5903165	32	23.89	0.017	13.164
AIR-M-4	07-30-1991	MNK-975	5903162	32	26.92	0.013	9.153
AIR-M-4	08-05-1991	MLY-430	5903159	32	23.89	0.011	8.391
AIR-M-4	08-11-1991	MLY-433	5903156	32	23.89	0.026	20.321
AIR-M-4	08-17-1991	MLY-436	5903153	32	23.89	0.007	5.388
AIR-M-4	08-23-1991	MLY-439	5903486	32	23.90	0.014	10.387
AIR-M-4	08-29-1991	MLY-442	5903483	32	23.90	0.004	3.001
AIR-M-4	09-04-1991	MLY-445	5903480	32	23.90	0.008	6.463
AIR-M-4	09-10-1991	MLY-448	5903444	32	23.89	0.007	5.311
AIR-M-4	09-16-1991	MHH-951	5903441	32	23.89	0.007	5.311
AIR-M-4	09-22-1991	MHH-954	5903438	32	23.90	0.015	11.313
AIR-M-4	09-28-1991	MHH-957	5903435	32	23.90	0.026	19.698
AIR-M-4	10-04-1991	MHH-961	5903431	33	23.90	0.026	19.028
AIR-M-4	10-10-1991	MHH-964	5902992	33	47.80	0.027	10.222
AIR-M-4	10-22-1991	MHH-967	5902989	33	23.90	0.016	11.865
AIR-M-4	10-28-1991	MHH-970	5902986	33	23.90	0.004	2.686

Table A-9. Suspended Particulates (PM_{10}) Data for Station AIR-M-5 during 1991

Sample Location	Sample Date	Ticket Number	Filter Number	Flow Rate (SCFM)	Sample Time (Hours)	Weight (g/F)	Concentration ($\mu g/m^3$)
AIR-M-5	04-01-1991	MHN-977	5771223	33	24.27	0.025	18.079
AIR-M-5	04-07-1991	MDV-843	5771220	33	24.27	0.026	19.034
AIR-M-5	04-13-1991	MDV-846	5771217	33	24.27	0.017	12.197
AIR-M-5	04-19-1991	MDV-849	5771214	33	24.27	0.017	12.125
AIR-M-5	04-25-1991	MNH-980	5771211	33	24.27	0.045	32.917
AIR-M-5	05-19-1991	MNH-992	5903063	32	24.27	0.048	35.987
AIR-M-5	05-25-1991	MNH-995	5903060	32	24.26	0.017	13.115
AIR-M-5	05-01-1991	MHN-983	5767691	32	24.27	0.041	31.069
AIR-M-5	05-13-1991	MHN-989	5767685	32	24.28	0.029	21.818
AIR-M-5	05-07-1991	MHN-986	5767688	32	24.27	0.015	11.594
AIR-M-5	06-06-1991	MNH-998	5903057	32	48.52	0.069	26.229
AIR-M-5	06-12-1991	MNK-952	5903054	32	24.28	0.021	15.682
AIR-M-5	06-18-1991	MNK-955	5903051	32	24.25	0.011	8.495
AIR-M-5	06-24-1991	MNK-958	5903048	32	24.26	0.035	26.535
AIR-M-5	06-30-1991	MNK-961	5903176	32	24.25	0.015	11.375
AIR-M-5	07-06-1991	MNK-964	5903173	32	24.26	0.055	41.624
AIR-M-5	07-12-1991	MNK-967	5903170	32	24.24	0.018	13.426
AIR-M-5	07-18-1991	MNK-970	5903167	32	24.25	0.016	12.209
AIR-M-5	07-24-1991	MNK-973	5903164	32	24.25	0.011	8.645
AIR-M-5	07-30-1991	MLY-428	5903161	32	24.24	0.017	13.047
AIR-M-5	08-05-1991	MLY-431	5903158	32	24.26	0.008	6.140
AIR-M-5	08-11-1991	MLY-434	5903155	32	24.25	0.006	4.550
AIR-M-5	08-17-1991	MLY-437	5903152	32	24.24	0.004	3.110
AIR-M-5	08-23-1991	MLY-440	5903485	32	24.25	0.011	8.114
AIR-M-5	08-29-1991	MLY-443	5903482	32	24.25	0.006	4.703
AIR-M-5	09-04-1991	MLY-446	5903446	32	24.25	0.009	6.672
AIR-M-5	09-10-1991	MLY-449	5903443	32	24.26	0.006	4.170
AIR-M-5	09-16-1991	MHH-952	5903440	32	24.26	0.007	5.610
AIR-M-5	09-22-1991	MHH-955	5903437	32	27.58	0.016	10.869
AIR-M-5	09-28-1991	MHH-958	5903434	32	24.26	0.027	20.543
AIR-M-5	10-04-1991	MHH-962	5903430	33	24.26	0.018	12.940
AIR-M-5	10-10-1991	MHH-965	5902991	33	48.52	0.035	12.753
AIR-M-5	10-22-1991	MHH-968	5902988	33	24.26	0.016	11.614
AIR-M-5	10-28-1991	MHH-971	5903985	33	24.26	0.004	3.234

Table A-10. Suspended Particulates (PM_{10}) Data for Station AIR-M-6 during 1991

Sample Location	Sample Date	Ticket Number	Filter Number	Flow Rate (SCFM)	Sample Time (Hours)	Weight (g/F)	Concentration ($\mu g/m^3$)
AIR-M-6	04-01-1991	MHN-978	5771222	33	23.99	0.018	13.680
AIR-M-6	04-07-1991	MDV-844	5771219	33	24.00	0.022	16.270
AIR-M-6	04-13-1991	MDV-847	5771216	33	24.00	0.000	0.074
AIR-M-6	04-19-1991	MDV-850	5771213	33	23.98	0.009	6.395
AIR-M-6	04-25-1991	MNH-981	5771210	33	23.98	0.028	20.453
AIR-M-6	05-19-1991	MNH-993	5903062	32	23.97	0.040	30.300
AIR-M-6	05-25-1991	MNH-996	5903059	32	24.01	0.011	8.041
AIR-M-6	05-01-1991	MHN-982	5767690	32	23.98	0.035	26.684
AIR-M-6	05-13-1991	MHN-990	5767684	32	23.97	0.017	13.350
AIR-M-6	05-07-1991	MHN-987	5767687	32	23.97	0.009	6.753
AIR-M-6	06-06-1991	MNH-999	5903056	32	47.98	0.057	21.731
AIR-M-6	06-12-1991	MNK-953	5903053	32	23.99	0.012	9.505
AIR-M-6	06-18-1991	MNK-956	5903050	32	24.00	0.011	8.584
AIR-M-6	06-24-1991	MNK-959	5903047	32	24.00	0.027	20.304
AIR-M-6	06-30-1991	MNK-962	5903175	32	24.01	0.012	8.885
AIR-M-6	07-06-1991	MNK-965	5903172	32	23.99	0.040	30.811
AIR-M-6	07-12-1991	MNK-968	5903169	32	24.00	0.012	8.890
AIR-M-6	07-18-1991	MNK-971	5903166	32	24.00	0.014	10.499
AIR-M-6	07-24-1991	MNK-974	5903163	32	23.99	0.010	7.358
AIR-M-6	07-30-1991	MLY-429	5903160	32	23.98	0.015	11.579
AIR-M-6	08-05-1991	MLY-432	5903157	32	23.98	0.010	7.362
AIR-M-6	08-11-1991	MLY-435	5903154	32	23.98	0.006	4.218
AIR-M-6	08-17-1991	MLY-438	5903487	32	23.99	0.001	0.996
AIR-M-6	08-23-1991	MLY-441	5903484	32	24.00	0.009	7.202
AIR-M-6	08-29-1991	MLY-444	5903481	32	23.98	0.001	0.460
AIR-M-6	09-04-1991	MLY-447	5903445	32	23.98	0.006	4.908
AIR-M-6	09-10-1991	MLY-450	5903442	32	23.98	0.005	4.065
AIR-M-6	09-16-1991	MHH-953	5903439	32	23.98	0.004	3.221
AIR-M-6	09-22-1991	MHH-956	5903436	32	23.97	0.014	10.587
AIR-M-6	09-28-1991	MHH-959	5903433	32	23.98	0.028	21.321
AIR-M-6	10-04-1991	MHH-963	5903429	33	23.97	0.013	9.521
AIR-M-6	10-10-1991	MHH-966	5902990	33	47.96	0.025	9.110
AIR-M-6	10-22-1991	MHH-969	5902987	33	23.99	0.011	8.103
AIR-M-6	10-28-1991	MHH-972	5903984	33	23.99	-0.004	-2.602

Table A-11. Second Quarter Environmental Radiation Exposure for Monticello, 1991

Report Number	Report Date	Date Installed	Date Removed	Days Exposed
8052-1	07-29-1991	04-01-1991	06-28-1991	92

Report ID	TLD ID	Field Location	Reported Value[a] for Quarter (mrem/qtr)	Corrected Value[b] Daily Exposure (mrem/day)	Approx. Annual Exposure (mrem/yr)
1991-2	GJ-25	TLD-M-01	27.6	.3	109.5
1991-2	GJ-13	TLD-M-02	27.3	.2967	108.296
1991-2	GJ-28	TLD-M-03	26.2	.2848	103.952
1991-2	GJ-21	TLD-M-04	35.7	.388	141.62
1991-2	GJ-20	TLD-M-05	116.3	1.2641	461.397
1991-2	GJ-11	TLD-M-06	102.3	1.112	405.88
1991-2	GJ-10	TLD-M-07	46.5	.5054	184.471
1991-2	GJ-17	TLD-M-08	32.1	.3489	127.349
1991-2	GJ-14	TLD-M-09	53.2	.5783	211.08
1991-2	GJ-26	TLD-M-10	No Data	No Data	No Data
1991-2	GJ-24	TLD-M-10-D[c]	33.2	.3609	131.729
1991-2	GJ-1	TLD-M-11	52.7	.5728	209.072
1991-2	GJ-30	TLD-M-12	120.4	1.3087	477.676
1991-2	GJ-3	TLD-M-13	26.6	.2891	105.522

[a]The reported values are the results received from the subcontracted laboratory.

[b]The corrected values are derived by substracting the exposure received by the TLDs while in transit from the reported values.

[c]Duplicate sample.

Table A-12. Third Quarter Environmental Radiation Exposure for Monticello, 1991

Report Number	Report Date	Date Installed	Date Removed	Days Exposed
8052-2	10-22-1991	06-28-1991	10-01-1991	91

Report ID	TLD ID	Field Location	Reported Value[a] for Quarter (mrem/qtr)	Corrected Value[b] Daily Exposure (mrem/day)	Approx.Annual Exposure (mrem/yr)
1991-3	GJ-22	TLD-M-01	24.4	.2681	97.857
1991-3	GJ-24	TLD-M-02	22.4	.2462	89.863
1991-3	GJ-18	TLD-M-03	23.7	.2604	95.046
1991-3	GJ-21	TLD-M-04	33.5	.3681	134.357
1991-3	GJ-20	TLD-M-05	116.8	1.2835	468.478
1991-3	GJ-12	TLD-M-06	98	1.0769	393.069
1991-3	GJ-11	TLD-M-07	39.7	.4363	159.25
1991-3	GJ-25	TLD-M-07-D[c]	39.5	.4341	158.447
1991-3	GJ-10	TLD-M-08	28	.3077	112.311
1991-3	GJ-23	TLD-M-09	49.7	.5462	199.363
1991-3	GJ-30	TLD-M-10	30.9	.3396	123.954
1991-3	GJ-29	TLD-M-11	46.5	.511	186.515
1991-3	GJ-28	TLD-M-12	108.3	1.1901	434.387
1991-3	GJ-14	TLD-M-13	24.6	.2703	98.66

[a]The reported values are the results received from the subcontracted laboratory.

[b]The corrected values are derived by substracting the exposure received by the TLDs while in transit from the reported values.

[c]Duplicate sample.

Table A-13. Fourth Quarter Environmental Radiation Exposure for Monticello, 1991

Report Number	Report Date	Date Installed	Date Removed	Days Exposed
8052-3	02-21-1992	10-01-1991	12-30-1991	90

Report ID	TLD ID	Field Location	Reported Value[a] for Quarter (mrem/qtr)	Corrected Value[b] Daily Exposure (mrem/day)	Approx. Annual Exposure (mrem/yr)
1991-4	GJ-7	TLD-M-01	26.7	.2967	108.296
1991-4	GJ-2	TLD-M-02	26.1	.29	105.85
1991-4	GJ-16	TLD-M-03	25.3	.2811	102.602
1991-4	GJ-13	TLD-M-04	32.2	.3578	130.597
1991-4	GJ-19	TLD-M-05	107.4	1.1933	435.555
1991-4	GJ-27	TLD-M-06	98	1.0889	397.449
1991-4	GJ-21	TLD-M-06-D[c]	102.3	1.1367	414.896
1991-4	GJ-24	TLD-M-07	41.2	.4578	167.097
1991-4	GJ-26	TLD-M-08	30.5	.3389	123.699
1991-4	GJ-28	TLD-M-09	53.2	.5911	215.752
1991-4	GJ-29	TLD-M-10	31.8	.3533	128.955
1991-4	GJ-4	TLD-M-11	52.7	.5856	213.744
1991-4	GJ-30	TLD-M-12	139.1	1.5456	564.144
1991-4	GJ-5	TLD-M-13	28.6	.3178	115.997

[a]The reported values are the results received from the subcontracted laboratory.

[b]The corrected values are derived by substracting the exposure received by the TLDs while in transit from the reported values.

[c]Duplicate sample.

Please note

Tables A-14 and A-15 may contain different units for the same constituent. For example, sodium (Na) concentrations are expressed as mg/L in Table A-14, whereas they are expressed as μg/L in Table A-15. The units listed are those reported by the laboratory that performed the analysis. Please exercise care when comparing these data.

Table A-14. Water Chemistry Data for Monticello Millsite April 2 and April 29, 1991[a]

Sample Location	Ticket Number	Sample Date	Alky (mg/L) (as CaCO3)	Alpha (pCi/L)[b]	As (mg/L)	Cdt (µmho/cm)	Dtw (feet)	Herb (µg/L)	Mo (mg/L)	NH4-N (mg/L)	NO3 (mg/L)	Pest (mg/L)
Ground Water												
82-08	MLY-399	04-29-1991	246	138	<0.01	2110	9.27	No Data	0.016	No data	9.22	No Data
82-20	MLY-385	04-02-1991	294	<60	<0.01	2450	16.25	No Data	<0.01	0.27	2.37	No Data
82-30B	MLY-396	04-02-1991	382	409	0.113	2270	17.22	No Detect	0.228	2.25	0.15	No Detect
82-30C	MLY-397	04-02-1991	355	No Data	No Data	1807	17.97	No Detect	No data	No data	0.18	No Detect
82-31B-E	MLY-388	04-02-1991	338	<78	<0.01	3010	5.22	No Detect	<0.01	0.28	0.39	No Detect
82-31B-E (DUP)	MLY-389	04-02-1991	No Data	<74	<0.01	No Data	No Data	No Detect	<0.01	0.27	0.44	No Detect
82-36A	MLY-382	04-02-1991	533	1738	0.015	6550	46.45	No Detect	0.569	13.8	28.1	No Detect
82-40A	MLY-394	04-02-1991	357	617	0.044	2100	21.82	No Detect	0.184	2.15	0.1	No Detect
82-43	MLY-390	04-02-1991	288	<39	<0.01	1675	8.33	No Detect	0.012	0.2	1.04	No Detect
82-44	MLY-386	04-02-1991	236	No Data	No Data	895	10.47	No Detect	No data	No data	No data	No Detect
82-45B	MLY-392	04-02-1991	280	<27	<0.01	1146	3.98	No Detect	<0.01	0.14	0.81	No Detect
82-51	MLY-381	04-02-1991	376	46	<0.01	1428	8.37	No Data	<0.01	0.12	0.11	No Data
82-52	MLY-395	04-02-1991	387	49	0.021	1565	20.98	No Detect	<0.01	0.64	0.12	No Detect
84-74	MLY-427	04-29-1991	199	<9	<0.01	634	63.39	No Data	<0.01	No Data	0.06	No Data
86-78	MLY-391	04-02-1991	248	No Data	No Data	1751	7.43	No Detect	No data	No data	0.92	No Detect
Surface Water												
CARBONATE SEEP	MLY-375	04-02-1991	286	2970	0.127	2040	No Data	No Data	0.169	0.16	0.08	No Data
MONTEZUMA CREEK	MLY-376	04-02-1991	228	103	<0.01	1970	No Data	No Data	0.031	0.11	0.06	No Data
NORTH DRAINAGE	MLY-378	04-02-1991	648	85	<0.01	2270	No Data	No Data	<0.01	54.7	1.35	No Data
SORENSON SITE	MLY-377	04-02-1991	273	133	<0.01	2110	No Data	No Data	0.019	0.14	0.26	No Data
W-2	MLY-380	04-02-1991	665	1143	1.66	5550	No Data	No Data	3.42	<0.02	64.1	No Data
W-3	MLY-384	04-02-1991	57	<7	<0.01	144	No Data	No Data	<0.01	1.62	2.68	No Data
W-4	MLY-400	04-29-1991	332	314	<0.01	2060	No Data	No Data	0.054	No Data	6.44	No Data
W-5	MLY-383	04-29-1991	302	<26	<0.01	1025	No Data	No Data	<0.01	0.57	1.32	No Data
QA/QC												
Equipment Blank	MLY-393	04-02-1991	No Data	<4	<0.01	No Data	No Data	No Detect	<0.01	0.11	0.09	No Detect
Equipment Blank	MLY-426	04-29-1991	No Data	<4	<0.01	No Data	No Data	No Data	<0.01	No Data	0.08	No Data
Trip Blank	MLY-387	04-02-1991	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Water Blank	MLY-398	04-02-1991	No Data	No Data	No Data	No Data	No Data	No Detect	No Data	No Data	No Data	No Detect

[a] A "<" symbol indicates that the maximum concentration was below detection limits (number shown is detection limit); "No Detect" also indicates that the maximum concentration was below detection limits (detection limits are listed in Table A-16).

[b] The values listed multiplied by 10^{-8} will result in µCi/mL.

Table A-14 (continued). Water Chemistry Data for Monticello Millsite April 2 and April 29, 1991[a]

Sample Location	Ticket Number	Sample Date	pH (units)	Ra-226 (pCi/L)[b]	Ra-228 (pCi/L)[b]	Se (mg/L)	Semival (µg/L)	Temp (Deg C)	U-234 (pCi/L)[b]	U-234 (pCi/L)[b]	V (mg/L)	Volatile (µg/L)
Ground Water												
82-08	MLY-399	04-29-1991	6.29	0.2	<2	0.034	No Data	8.8	82.4	78.6	<0.05	No Data
82-20	MLY-385	04-02-1991	6.69	0.2	<1	0.007	No Data	10.2	5.4	2.5	<0.05	No Data
82-30B	MLY-396	04-02-1991	7	0.4	<2	0.038	No Detect	9.7	227	241	3	See Table[c]
82-30C	MLY-397	04-02-1991	6.87	No Data	No Data	No Data	No Detect	10.5	No Data	No Data	No Data	See Table[c]
82-31B-E	MLY-388	04-02-1991	6.82	0.2	<2	<0.005	No Detect	7.8	16.8	6.2	<0.05	See Table[c]
82-31B-E (DUP)	MLY-389	04-02-1991	No Data	0.5	<2	<0.005	No Detect	No Data	18.4	6	<0.05	See Table[c]
82-36A	MLY-382	04-02-1991	7.16	7.6	<3	0.011	No Detect	9	1229	1237	0.384	See Table[c]
82-40A	MLY-394	04-02-1991	7.02	2.5	<3	<0.005	No Detect	10.8	352	364	0.355	No Detect
82-43	MLY-390	04-02-1991	6.89	<0.1	<2	<0.005	No Detect	7.1	5.5	3.1	<0.05	No Detect
82-44	MLY-386	04-02-1991	7.19	No Data	No Data	No Data	No Detect	8.8	No Data	No Data	No Data	See Table[c]
82-45B	MLY-392	04-02-1991	7.05	0.2	<2	<0.005	No Detect[d]	8.1	6.4	5.1	<0.05	No Detect
82-51	MLY-381	04-02-1991	6.8	0.2	<2	<0.005	No Data	10.6	21.1	19.7	<0.05	No Data
82-52	MLY-395	04-02-1991	6.85	0.2	<2	<0.005	No Detect	10.9	28.5	27	<0.05	See Table[c]
84-74	MLY-427	04-29-1991	7.5	0.7	<2	<0.005	No Data	No Data	<0.1	<0.1	<0.05	No Data
86-78	MLY-391	04-02-1991	6.87	No Data	No Data	No Data	No Detect	6.1	No Data	No Data	No Data	See Table[c]
Surface Water												
CARBONATE SEEP	MLY-375	04-02-1991	8.22	8.4	<3	0.037	No Data	15	1170	1166	6.58	No Data
MONTEZUMA CREEK	MLY-376	04-02-1991	8.02	0.2	<2	<0.005	No Data	9.4	58.3	58.4	<0.05	No Data
NORTH DRAINAGE	MLY-378	04-02-1991	8.04	6.6	<3	<0.005	No Data	15	34.2	29.3	<0.05	No Data
SORENSON SITE	MLY-377	04-02-1991	7.99	0.3	<2	0.012	No Data	9.2	99.8	101	<0.05	No Data
W-2	MLY-380	04-02-1991	9.16	4.7	<3	0.613	No Data	17.5	507	580	63.6	No Data
W-3	MLY-384	04-29-1991	8.31	0.2	<3	<0.005	No Data	8.2	0.7	0.6	<0.05	No Data
W-4	MLY-400	04-29-1991	6.92	0.4	<2	0.028	No Data		199.5	200.3	0.337	No Data
W-5	MLY-383	04-02-1991	7.81	0.5	<2	<0.005	No Data	6.6	6	3.7	<0.05	No Data
QA/QC												
Equipment Blank	MLY-393	04-29-1991	No Data	<0.1	<2	<0.005	No Detect[e]	No Data	<0.1	<0.1	<0.05	See Table[c]
Equipment Blank	MLY-426	04-02-1991	No Data	<0.1	<2	<0.005	No Data	No Data	<0.1	<0.1	<0.05	No Data
Trip Blank	MLY-387	04-02-1991	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	See Table[c]
Water Blank	MLY-398	04-02-1991	No Data	No Data	No Data	No Data	No Detect	No Data	No Data	No Data	No Data	See Table[c]

[a] A "<" symbol indicates that the maximum concentration was below detection limits (number shown is detection limit); "No Detect" also indicates that the maximum concentration was below detection limits (detection limits are listed in Table A-16).

[b] The values listed multiplied by 10^{-9} will result in µCi/mL.

[c] The constituents detected are listed in Table A-16.

[d] An unknown semivolatile (UNK-9.74) measuring 20 µg/L was detected.

[e] An unknown semivolatile (UNK-9.74) measuring 52 µg/L was detected.

Table A-15. Water Chemistry Data for Monticello Millsite, October 20, 1991[a]

Sample Location	Ticket Number	Sample Date	Alky (mg/L) (as CaCO3)	Alpha (pCi/L)[b]	As (µg/L)	Cdt (µmho/cm)	Dtw (feet)	Herb (µg/L)	Mo (µg/L)	NO3 (mg/L)	Pest (µg/L)	pH (units)
Ground Water												
82-08	MLY-511	10-20-91	305	160	<3	2120	10.38	No Data	<18	11.9	No Data	6.5
82-20	MLY-508	10-20-91	366	<50	<3	2290	19.09	No Data	<18	3.62	No Data	6.78
82-30B	MLY-523	10-20-91	375	500	127	2070	19.10	No Detect	272	0.11	No Detect	7.18
82-30C	MLY-513	10-20-91	177	No Data	No Data	1722	19.78	No Detect	No Data	0.12	No Detect	7.06
82-31 B-E	MLY-518	10-20-91	173	<80	<3	3150	4.15	No Detect	<18	0.08	No Detect	6.72
82-31 B-E (DUP)	MLY-519	10-20-91	No Data	<80	<3	No Data	No Data	No Data	<18	0.04	No Detect	No Data
82-36A	MLY-510	10-20-91	533	2500	No Data	3790	46.67	No Detect	593	29	No Detect	6.82
82-40A	MLY-522	10-20-91	430	880	55.4	1865	22.96	No Detect	184	0.11	No Detect	7
82-43	MLY-517	10-20-91	131	<40	<3	1703	11.17	No Detect	<18	1.89	No Detect	6.76
82-44	MLY-509	10-20-91	357	No Data	No Data	1159	13.46	No Detect	No Data	1.49	No Detect	6.98
82-45B	MLY-520	10-20-91	128	<30	<3	1426	5.44	No Detect	<18	1.2	No Detect	6.9
82-51	MLY-521	10-20-91	156	40	No Data	1243	10.59	No Data	<18	0.03	No Data	6.92
82-52	MLY-524	10-20-91	No Data	60	24.4	1361	22.82	No Detect	<18	0.06	No Detect	7.2
84-74	MLY-514	10-20-91	90	<13	<3	620	63.74	No Data	<18	0.24	No Data	7.67
86-78	MLY-516	10-20-91	111	No Data	No Data	1835	10.19	No Detect	No Data	2.91	No Detect	6.76
88-87	MLY-512	10-20-91	396	No Data	No Data	1848	8.08	No Detect	No Data	5.45	No Detect	7.18
Surface Water												
CARBONATE SEEP	MLY-505	10-20-91	338	3300	260	3850	260	No Data	135	0.19	No Data	8.13
MONTEZUMA CANYON	MLY-501	10-20-91	211	<40	<3	1866	<3	No Data	<18	0.16	No Data	7.7
SORENSON SITE	MLY-502	10-20-91	305	320	<3	2160	<3	No Data	~24.2	0.17	No Data	8.18
W-2	MLY-504	10-20-91	661	1800	2100	5340	2100	No Data	3790	24.3	No Data	9.31
W-4	MLY-506	10-20-91	386	370	10.3	1815	10.3	No Data	51.6	1.96	No Data	6.74
W-5	MLY-503	10-20-91	357	<20	<3	1008	<3	No Data	<18	0.17	No Data	8.12
QA/QC												
Equipment Blank	MLY-515	10-20-91	No Data	<6	<3	No Data	<3	No Detect	<18	0.09	No Detect	No Data
Trip Blank	MLY-507	10-20-91	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

[a]A "<" symbol indicates that the maximum concentration was below detection limits (number shown is detection limit). A "~" indicates an approximate value (the value was outside the limits for which the instrument was calibrated). "No Detect" indicates that the maximum concentration was below detection limits (detection limits are listed in Table A-16).

[b]The values listed multiplied by 10^{-9} will result in µCi/mL.

Table A-15 (continued). Water Chemistry Data for Monticello Millsite, October 20, 1991[a]

Sample Location	Ticket Numbe	Sample Date	Ra-226 (pCi/L)[b]	Ra-228 (pCi/L)[b]	Se (µg/L)	Semivol (µg/L)	Temp (Deg C)	Th-230 (pCi/L)[b]	U-234 (pCi/L)[b]	U-238 (pCi/L)[b]	V (µg/L)	Volatiles (µg/L)
Ground Water												
82-08	MLY-511	10-20-91	0.2	<3	24	No Data	12.8	<3.8	81	79	<10	No Data
82-20	MLY-508	10-20-91	<0.1	<2	<2	No Data	10	0.4	5.3	2.5	<10	No Data
82-30B	MLY-523	10-20-91	0.3	<3	18.5	No Detect	10	<3.6	226	252	3630	See Table[c]
82-30C	MLY-513	10-20-91	No Data	No Data	No Data	No Detect	10.8	No Data	No Data	No Data	No Data	See Table[c]
82-31 B-E	MLY-518	10-20-91	0.2	<3	<20	No Detect	12.8	<0.2	24.4	8	<10	No Detect
82-31 B-E (DUP)	MLY-519	10-20-91	0.2	<2	<20	No Data	No Data	<0.3	23.1	7.6	<10	No Detect
82-36A	MLY-510	10-20-91	9.4	<6	<20	No Detect	12.6	<4.6	963	988	479	See Table[c]
82-40A	MLY-522	10-20-91	1.9	<2	<2	No Detect	10.6	<4.1	375	395	343	No Detect
82-43	MLY-517	10-20-91	0.1	<2	<2	No Detect	10.5	<0.7	5.2	2.5	<10	No Detect
82-44	MLY-509	10-20-91	No Data	No Data	No Data	No Detect	10	No Data	No Data	No Data	No Data	No Detect
82-45B	MLY-520	10-20-91	0.2	<2	<2	No Detect	12.2	0.3	8.4	6.3	<10	No Detect
82-51	MLY-521	10-20-91	0.3	<4	<2	No Data	10.5	0.4	18.2	16.6	<10	No Data
82-52	MLY-524	10-20-91	0.3	<3	<2	No Detect	10.5	0.2	30.1	32.4	<10	See Table[c]
84-74	MLY-514	10-20-91	1	<7	<2	No Data	10.8	<0.3	0.4	<0.3	<10	No Data
86-78	MLY-516	10-20-91	No Data	No Data	No Data	No Detect	10.1	No Data	No Data	No Data	No Data	See Table[c]
88-87	MLY-512	10-20-91	No Data	No Data	No Data	No Data	11.7	No Data	No Data	No Data	No Data	No Detect
Surface Water												
CARBONATE SEEP	MLY-505	10-20-91	10.4	<4	<20	No Data	15.6	<4.1	1368	1415	2910	No Data
MONTEZUMACANYON	MLY-501	10-20-91	0.1	<2	<2	No Data	11.2	<0.8	10.3	8.9	<10	No Data
SORENSON SITE	MLY-502	10-20-91	0.5	<2	~2.5	No Data	13.8	5	170	159	<10	No Data
W-2	MLY-504	10-20-91	3	<3	1250	No Data	13.1	<3.6	610	626	93000	No Data
W-4	MLY-506	10-20-91	0.5	<2	14.7	No Data	12.4	<0.3	159	161	336	No Data
W-5	MLY-503	10-20-91	3.3	<4	<2	No Data	10.3	0.7	2.8	1.3	<10	No Data
QA/QC												
Equipment Blank	MLY-515	10-20-91	<0.1	<2	<2	No Detect	No Data	<0.3	<0.3	<0.3	<10	See Table[c]
Trip Blank	MLY-507	10-20-91	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Detect

[a]A "<" symbol indicates that the maximum concentration was below detection limits (number shown is detection limit). A "~" indicates an approximate value (the value was outside the limits for which the instrument was calibrated). "No Detect" indicates that the maximum concentration was below detection limits (detection limits are listed in Table A-16).

[b]The values listed multiplied by 10^{-9} will result in µCi/mL.

[c]The constituents detected are listed in Table A-17.

Table A-16. Target Compound List of Constituents Analyzed for in Ground Water at the Monticello Millsite

CAS No.	Constituent	Detection Limit (µg/L)
Volatile Organics		
74-87-3	Chloromethane	2
74-83-9	Bromomethane	2
75-01-4	Vinyl Chloride	2
75-00-3	Chloroethane	2
75-09-2	Methylene Chloride	1
67-64-1	Acetone	2
75-15-0	Carbon Disulfide	1
75-35-4	1,1-Dichloroethene	1
75-34-3	1,1-Dichloroethane	1
540-59-0	1,2-Dichloroethene (Total)	1
67-66-3	Chloroform	1
107-06-2	1,2-Dichloroethane	1
78-93-3	2-Butanone	2
71-55-6	1,1,1-Trichloroethane	1
56-23-5	Carbon tetrachloride	1
108-05-4	Vinyl acetate	2
75-27-4	Bromodichloromethane	1
78-87-5	1,2-Dichloropropane	1
10061-01-5	CIS-1,3-Dichloropropene	1
79-01-6	Trichloroethene	1
124-48-1	Dibromochloromethane	1
79-00-5	1,1,2-Trichloroethane	1
71-43-2	Benzene	1
10061-02-6	Trans-1,3-Dichloropropene	1
75-25-2	Bromoform	1
108-10-1	4-Methyl-2-Pentanone	2
591-78-6	2-Hexanone	2
127-18-4	Tetrachloroethene	1
79-34-5	1,1,2,2-Tetrachloroethane	1
108-88-3	Toluene	1
108-90-7	Chlorobenzene	1
100-41-4	Ethylbenzene	1
100-42-5	Styrene	1
1330-20-7	M,P-Xylene	1
109-99-9	Furan, tetrahydro-	9

Table A-16 (continued). Target Compound List of Constituents Analyzed for in Ground Water at the Monticello Millsite

CAS No.	Constituent	Detection Limit (µg/L)
Semivolatile Organics		
99-09-2	3-Nitroaniline	50
83-32-9	Acenaphthene	10
51-28-5	2,4-Dinitrophenol	50
100-02-7	4-Nitrophenol	50
132-64-9	Dibenzofuran	10
121-14-2	2,4-Dinitrotoluene	10
84-66-2	Diethylphthalate	10
7005-72-3	4-Chlorophenyl-phenylether	10
86-73-7	Flourene	10
100-10-6	4-Nitroaniline	50
534-52-1	4,6-Dinitro-2-methylphenol	50
86-30-6	N-Nitrosodiphenylamine(1)	10
101-55-3	4-Bromophenyl-phenylether	10
118-74-1	Hexachlorobenzene	10
87-86-5	Pentachlorophenol	50
85-01-8	Phenanthrene	10
120-12-7	Anthracene	10
84-74-2	Di-n-butylphthalate	10
206-44-0	Flouranthene	10
129-00-0	Pyrene	10
85-68-7	Butylbenzylphthalate	10
91-94-1	3,3'-Dichlorobenzidine	20
56-55-3	Benzo(a)anthracene	10
218-01-9	Chrysene	10
117-81-7	bis(2-Ethylhexyl)phthalate	10
117-84-0	Di-n-octylphthalate	10
205-99-2	Benzo(b)flouranthene	10
207-08-9	Benzo(k)flouranthene	10
50-32-8	Benzo(a)pyrene	10
193-39-5	Indeno(1,2,3-cd)pyrene	10
53-70-3	Dibenzo(a,h)anthracene	10
191-24-2	Benzo(g,h,i)perylene	10
108-95-2	Phenol	10
111-44-4	bis(2-Chloroethyl)ether	10
95-57-8	2-Chlorophenol	10
541-73-1	1,3-Dichlorobenzene	10
106-46-7	1,4-Dichlorobenzene	10
100-51-6	Benzyl alcohol	50
95-50-1	1,2-Dichlorobenzene	10

Table A-16 (continued). Target Compound List of Constituents Analyzed for in Ground Water at the Monticello Millsite

CAS No.	Constituent	Detection Limit (µg/L)
Semivolatile Organics (Continued)		
95-48-7	2-Methylphenol	10
108-60-1	bis(2-Chloroisopropyl)ether	10
106-44-5	4-Methylphenol	10
621-64-7	N-Nitroso-di-n-propylamine	10
67-72-1	Hexachloroethane	10
98-95-3	Nitrobenzene	10
78-59-1	Isophorone	10
88-75-5	2-Nitrophenol	10
105-67-9	2,4-Dimethylphenol	10
65-85-0	Benzoic acid	50
111-91-1	bis(2-Chloroethoxy)methane	10
120-83-2	2,4-Dichlorophenol	10
120-82-1	1,2,4-Trichlorobenzene	10
91-20-3	Naphthalene	10
106-47-8	4-Chloroaniline	10
87-68-3	Hexachlorobutadiene	10
9-50-7	4-Chloro-3-methylphenol	10
91-57-6	2-Methylnaphthalene	10
77-47-4	Hexachlorocyclopentadiene	10
88-06-2	2,4,6-Trichlorophenol	10
95-95-4	2,4,5-Trichlorophenol	50
91-58-7	2-Chloronaphthalene	10
88-74-4	2-Nitroaniline	50
131-11-3	Dimethylphthalate	10
208-96-8	Acenaphthylene	10
606-20-2	2,6-Dinitrotoluene	10
Herbicide Organics		
94-75-7	2,4-D	0.25
94-82-6	2,4-DB	0.25
93-72-1	2,4,5-TP (Silvex)	0.20
93-76-5	2,4,5-T	0.20
75 99-0	Dalapon	5.0
1918-00-9	Dicamba	0.25
88-85-7	Dinoseb	0.10
94-74-6	MCPA	250
7085-19-0	MCPP	200

Table A-16 (continued). Target Compound List of Constituents Analyzed for in Ground Water at the Monticello Millsite

CAS No.	Constituent	Detection Limit (µg/L)
Pesticide Organics		
319-84-6	alpha-BHC	0.05
319-85-7	beta-BHC	0.05
319-86-8	delta-BHC	0.05
58-89-9	gamma-BHC(Lindane)	0.05
76-44-8	Heptachlor	0.05
309-00-2	Aldrin	0.05
1024-57-3	Heptachlor epoxide	0.05
959-98-8	Endosulfan I	0.05
60-57-1	Dieldrin	0.11
72-55-9	4,4'-DDE	0.11
72-20-8	Endrin	0.11
33213-65-9	Endosulfan II	0.11
72-54-8	4,4'-DDD	0.11
1031-07-8	Endosulfan sulfate	0.11
50-29-3	4,4'-DDT	0.11
72-43-5	Methoxychlor	0.54
53494-70-5	Endrin ketone	0.11
7421-36-3	Endrin aldehyde	0.11
5103-71-9	alpha-Chlordane	0.05
5103-74-2	gamma-Chlordane	0.05
8001-35-2	Toxaphene	5.38
12674-11-2	Aroclor 1016	1.08
11104-28-2	Aroclor 1221	2.15
11141-16-5	Aroclor 1232	1.08
53469-21-9	Aroclor 1242	1.08
12672-29-6	Aroclor 1248	1.08
11097-69-1	Aroclor 1254	1.08
11096-82-5	Aroclor 1260	1.08

Table A-17. Water Chemistry Data for Monticello Millsite, April 2, 1991-Volatile Organics[a,b]

Sample Location	Ticket Number	Sampling Date	108-88-3 (µg/L)	109-99-9 (µg/L)	67-64-1 (µg/L)	67-66-3 (µg/L)	75-15-0 (µg/L)	75-27-4 (µg/L)	78-93-3 (µg/L)
Ground Water									
82-30B	MLY-396	04-02-91	-	-	-	-	-	-	-
82-30C	MLY-397	04-02-91	-	-	-	-	-	-	-
82-31B-E	MLY-388	04-02-91	-	-	-	-	-	-	-
82-31B-E DUPLIC	MLY-389	04-02-91	-	-	-	-	-	-	-
82-36A	MLY-382	04-02-91	-	-9	-	-	-	-	-
82-44	MLY-386	04-02-91	-	-	-	-	-	-	-
82-52	MLY-395	04-02-91	-	-	-	-	1	-	-
86-78	MLY-391	04-02-91	-	-	-	-	-	-	-
QA/QC									
Equipment Blank	MLY-393	04-02-91	-0.9	-	15	9	-	-	3
Trip Blank	MLY-387	04-02-91	-	-	-	11	-	2	-
Water Blank	MLY-398	04-02-91	1	-	-	8	-	-	-

[a]CAS Number 108-88-3 - Toluene
CAS Number 109-99-9 - Tetrahydrofuran
CAS Number 67-64-1 - Acetone
CAS Number 67-66-3 - Chloroform
CAS Number 75-15-0 - Carbon Disulfide
CAS Number 75-27-4 - Bromodichloromethane
CAS Number 78-93-3 - 2-Butanone
[b]A "-" indicates an approximate value (the value was outside the limits for which the instrument was calibrated).

Table A-17 (continued). Water Chemistry Data for Monticello Millsite, April 2, 1991-Volatile Organics[a,b]

Sample Location	Ticket Number	Sampling Date	UNK-31.95 (µg/L)	UNK-31.97 (µg/L)	UNK-32.00 (µg/L)	UNK-32.02 (µg/L)	UNK-32.03 (µg/L)	UNK-32.07 (µg/L)	UNK-32.08 (µg/L)	UNK-32.83 (µg/L)
Ground Water										
82-30B	MLY-396	04-02-91	-	-	-	-	-	~2	-	-
82-30C	MLY-397	04-02-91	-	-	-	-	-	~1	-	-
82-31B-E	MLY-388	04-02-91	-	-	-	-	-	-	-	~1
82-31B-E (DUP)	MLY-389	04-02-91	-	~1	-	-	-	-	-	-
82-36A	MLY-382	04-02-91	-	-	-	-	-	-	-	-
82-44	MLY-386	04-02-91	-	-	~1	-	-	-	-	-
82-52	MLY-395	04-02-91	-	-	-	-	~1	-	-	-
86-78	MLY-391	04-02-91	~1	-	-	-	-	-	-	-
QA/QC										
Equipment Blank	MLY-393	04-02-91	-	-	-	~2	-	-	-	-
Trip Blank	MLY-387	04-02-91	-	-	-	~1	-	-	-	-
Water Blank	MLY-398	04-02-91	-	-	-	-	-	-	~2	-

[a]UNK-31.95 - Unknown Halogenated Compound
UNK-31.97 - Unknown Halogenated Compound
UNK-32.00 - Unknown Halogenated Compound
UNK-32.02 - Unknown Halogenated Compound
UNK-32.03 - Unknown Halogenated Compound
UNK-32.07 - Unknown Halogenated Compound
UNK-32.08 - Unknown Halogenated Compound
UNK-32.83 - Unknown Hydrocarbon
[b]A "~" indicates an approximate value (the value was outside the limits for which the instrument was calibrated).

Table A-17 (continued). Water Chemistry Data for Monticello Millsite, April 2, 1991-Volatile Organics[a,b]

Sample Location	Ticket Number	Sampling Date	UNK-7.75 (µg/L)	UNK-7.85 (µg/L)	UNK-8.18 (µg/L)
Ground Water					
82-30B	MLY-396	04-02-91	-	-	-
82-30C	MLY-397	04-02-91	-	-	-
82-31B-E	MLY-388	04-02-91	-	-	-
82-31B-E (DUP)	MLY-389	04-02-91	-	-	-
82-36A	MLY-382	04-02-91	-	-	-
82-44	MLY-386	04-02-91	-	-	-
82-52	MLY-395	04-02-91	-	-	-
86-78	MLY-391	04-02-91	-	-	-
QA/QC					
Equipment Blank	MLY-393	04-02-91	-	-5	-
Trip Blank	MLY-387	04-02-91	-9	-	-
Water Blank	MLY-398	04-02-91	-	-	-3

[a]UNK-7.75 - Unknown
UNK-7.85 - Unknown
UNK-8.18 - Unknown
[b]A "-" indicates an approximate value (the value was outside the limits for which the instrument was calibrated).

Table A-18. Water Chemistry Data for Monticello Millsite, October 20, 1991-Volatile Organics[a,b]

Sample Location	Ticket Number	Sample Date	109-99-9 (µg/L)	67-64-1 (µg/L)	67-66-3 (µg/L)	75-25-2 (µg/L)	78-93-3 (µg/L)
Ground Water							
82-30B	MLY-523	10-20-91	-	-	-	-	-
82-30C	MLY-513	10-20-91	-	-	-	1	-
82-36A	MLY-510	10-20-91	-20.	-	-	-	-
82-52	MLY-524	10-20-91	-	-	-	-	-
86-78	MLY-516	10-20-91	-	-	-	-	-
QA/QC							
Equipment Blank	MLY-515	10-20-91	-	20.8	9	-	5.5

[a]CAS Number 109-99-9 - Tetrahydro-furan
CAS Number 67-64-1 - Acetone
CAS Number 67-66-3 - Chloroform
CAS Number 75-25-2 - Bromoform
CAS Number 78-93-3 - 2-Butanone
[b]A "-" indicates an approximate value (the value was outside the limits for which the instrument was calibrated).

Table A-19. Water Chemistry Data for Monticello Millsite October 20, 1991-Semivolatile Organics)[a,b]

Sample Location	Ticket Number	Sample Date	556672 (µg/L)	68-12-2 (µg/L)	UNK-10.64 (µg/L)	UNK-12.27 (µg/L)	UNK-13.87 (µg/L)	UNK-14.66 (µg/L)	UNK-14.88 (µg/L)	UNK-17.23 (µg/L)
Ground Waterd										
82-30B	MLY-523	10-20-91	-	-	-	-	-	-	-	-
82-30C	MLY-513	10-20-91	-	-	-	-	-	-	-	-
82-36A	MLY-510	10-20-91	-	-	~7.00	-	-	-	-	-
82-52	MLY-524	10-20-91	-	-	-	-	-	-	-	-
86-78	MLY-516	10-20-91	~64	-	-	~44	~283	~336	~37	~18
QA/QC										
Equipment Blank	MLY-515	10-20-91	-	~7.00	-	-	-	-	-	-

[a]CAS Number 556672 - Octamethylcyclotetrasiloxane
CAS Number 68-12-2 - N,N-Dimethylformamide
UNK-10.64 - Unknown
UNK-12.27 - Unknown Siloxane
UNK-13.87 - Unknown Mixture
UNK-14.66 - Unknown Mixture
UNK-14.88 - Unknown
UNK-17.23 - Unknown

[b]A "~" indicates an approximate value (the value was outside the limits for which the instrument was calibrated).

Table A-19 (continued). Water Chemistry Data for Monticello Millsite, October 20, 1991-Semivolatile Organics[a,b]

Sample Location	Ticket Number	Sample Date	UNK-21.80 (µg/L)	UNK-23.16 (µg/L)	UNK-26.50 (µg/L)	UNK-30.57 (µg/L)
Ground Water						
82-30B	MLY-523	10-20-91	-	-	~6	-
82-30C	MLY-513	10-20-91	-	-	-	-
82-36A	MLY-510	10-20-91	-	-	-	-
82-52	MLY-524	10-20-91	-	-	-	~4.00
86-78	MLY-516	10-20-91	~13	~11	-	-
QA/QC						
Equipment Blank	MLY-515	10-20-91	-	-	-	-

[a]UNK-21.80 - Unknown
UNK-23.16 - Unknown
UNK-26.50 - Unknown
UNK-30.57 - Aromatic Carboxylic Acid
[b]A "~" indicates an approximate value (the value was outside the limits for which the instrument was calibrated).